

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

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The 17-Ton Steam Hammer of Park, Bro. & Co., Pittsburgh.

We give in the accompanying engravings illustrations showing the new 17-ton steam hammer now being constructed for Messrs. Park, Bro. & Co. by Messrs. Wm. B. Bement & Son, of Philadelphia. The steam hammer will be the largest ever built in the country. It has a cylinder of 40 inches bore, with a stroke of 9 feet, and weighs 11 tons. The piston rod will be 11 inches in diameter.

used in construction, including anvil block, dies, holding-down bolts, &c., is about 525,000 pounds. The operator will stand on the ground level, and can allow the ram to fall by its gravity alone, or can add the steam pressure above the piston when the work requires it.

The base plate occupies a space on the ground 13 x 26 feet, and the entire height from ground level is a little more than 32 feet. The operation of the hammer and the means adopted for controlling the blow will

Co., at Creusot, France, a model of which was exhibited at the Paris Exposition of 1878. It was stated some time ago that Krupp intended to build a 120-ton hammer, but as yet it has not been built.

Whitney's Improvement in Firearms.
The first considerable improvement which this manufacture received in this country was given it by the ingenuity and industry of Eli Whitney, the inventor of the cotton

upon which the national armories were afterward arranged, and many of his improvements were transferred by his workmen to other establishments, and have become common property. His improvements in the manufacture of arms, it is generally conceded, laid his country under permanent obligations by augmenting the means of national defense. It is satisfactory also to know that though defrauded of his just rights by a portion of the country most benefited by his previous invention, his talents

make "the same parts of different guns as much alike as the successive impressions of a copper-plate engraving," and left little for the skill of the workmen to accomplish. He thus found it easier to instruct green hands than to combat the prejudices of those instructed in the English system, where each workman made a certain part of the gun, which required operations often widely distinct in their nature.

At a recent meeting of the Academy of

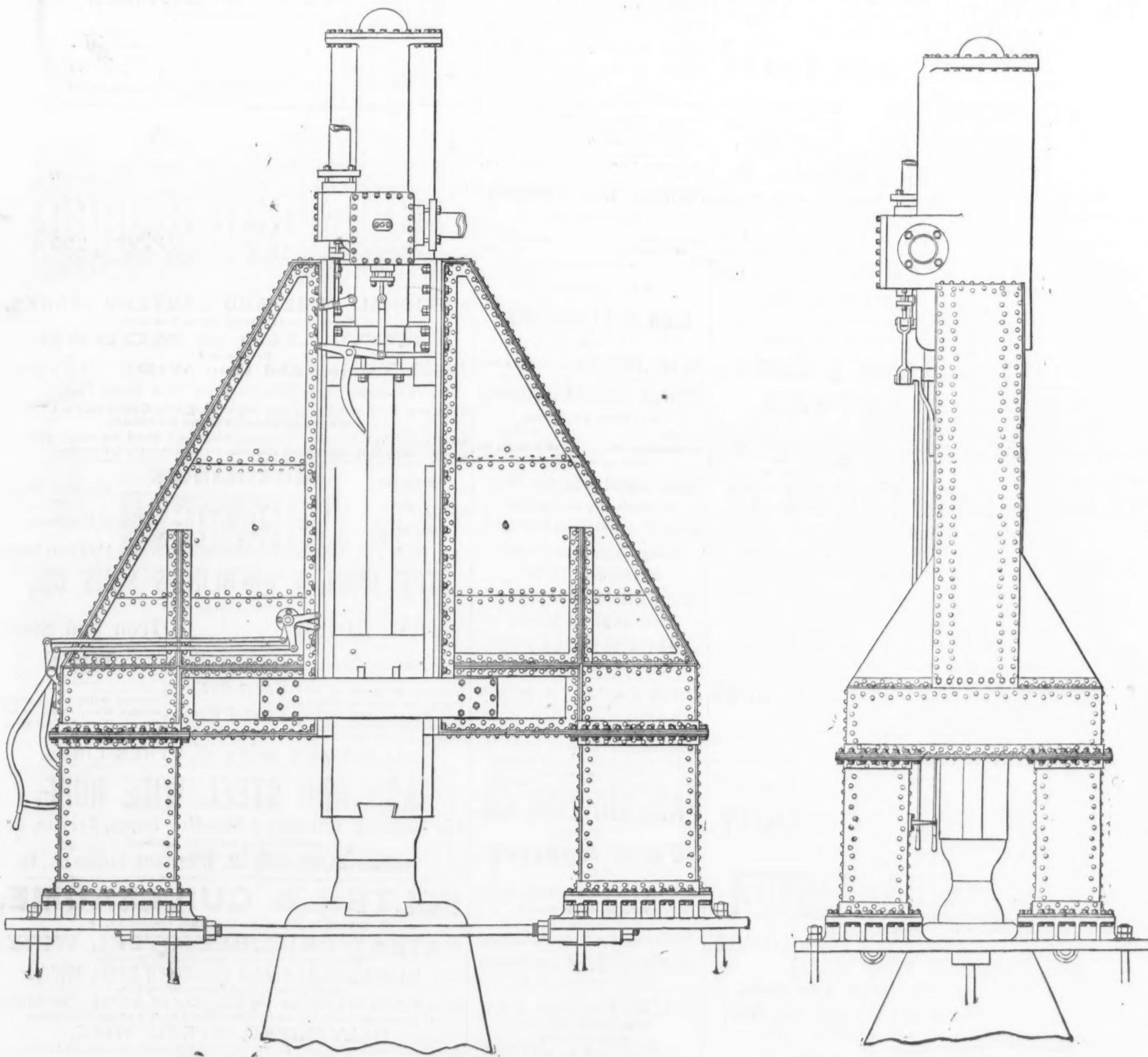


Fig. 1.—Elevation of 17-ton Steam Hammer.

Fig. 2.—Side Elevation.

THE 17-TON DOUBLE ACTING STEAM HAMMER OF THE BLACK DIAMOND STEEL WORKS.

The tup is a Krupp steel forging, about 6½ feet long, 4 feet wide and 2½ feet thick. The combined weight of the vertically moving parts, including a die or "bit" suitable for heavy forgings, will be about 17 tons. When the steam is admitted on top of the piston it will produce an additional force or weight of about 50 tons, making 67 tons pressure in all when the ram or hammer is stationary. The framing is constructed entirely of wrought-iron plates, most of which are from seven-eighths of an inch to 1½ inches in thickness, a few, however, being much thicker. The plates are joined by rivets and bolts with heavy strops and angle iron. The total weight of iron and steel

be readily understood by reference to our drawings. When it is completed and has been in operation, we may have occasion to give some additional details.

This is the largest hammer ever built in this country, and with it Park, Bro. & Co. will be enabled to execute orders for heavy cast-steel shafts and other forgings, which orders heretofore had to be sent across the Atlantic. A great many steam hammers in this country run from 3 to 5 tons, and there may be about half a dozen which will reach 10 tons, but the average is not over 5 tons. In Europe there are many hammers of much larger size, one of the most notable being an 80-ton hammer erected by M. Schneider &

gin, who turned his attention, in 1708, to the manufacture of muskets, and made a contract for 10,000 stand at \$13.40 each, or \$134,000 for the whole. He proceeded to construct a factory at the present village of Whitneystown, Connecticut, where, through successive administrations from that of the elder Adams, repeated contracts for the supply of arms were made and fulfilled to the entire approbation of the government. The construction of his factory, and even of the commonest tools, which were devised by him for the prosecution of the business in a manner peculiar to himself, evinced the fertility of his genius and the precision of his mind. The buildings became the model

were not unrewarded in this department, though many experienced gun makers, who, about the same time, contracted for the supply of muskets, which they attempted to make in the English method, were ruined by their engagements. The difficulties encountered at that time by the undeveloped state of many of the mechanic arts were overcome by the accuracy and dispatch of his machinery and tools, much of which was adapted to other manufactures of steel and iron, and may still be recognized in the leading workshops of the country.

Prof. Olmstead, from whose memoirs we have obtained the foregoing facts, states that Whitney contrived by machinery to

Sciences, Prof. Newberry, of Columbia College, gave an elaborate description of the antimony deposits lately discovered in Southern Utah. The mineral, a sulphide, is found cropping out in a thin stratum above the thick conglomerate rock of that section.

A trial of fire engines was recently made in this city, under the direction of the Fire Commissioners. The conditions were that the engines should be run for twelve consecutive hours, with a steam pressure limited at 100 pounds. Two of the three entered were disabled, the third, manufactured by Messrs. Clapp & Jones, of Hudson, coming out best.

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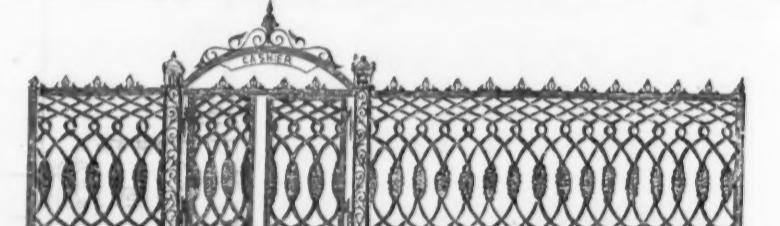
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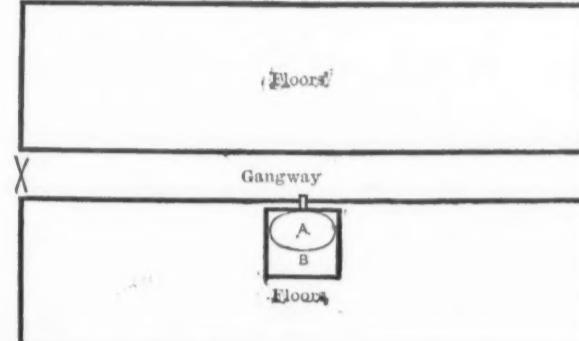
Papers on Practical Foundry.—IX.
BY EDWARD KIRK.

STOVE FOUNDING.—STOVE FOUNDRY BUILDINGS.

Stove foundry is the name given to a foundry in which stoves, ranges, grates and all the fixtures belonging to stoves are cast. When a foundry of this kind is started the first thing to be done is to erect the proper kind of a building. This building may be a brick or frame one according to the fancy of the builders, but a brick building is decidedly the better, for the floors of a foundry are always damp, and more or less dirt and rubbish is piled against the wall, both on the inside and outside. This dirt holds the dampness against the walls, and, if the building is a frame one, the sills and lower ends of the boards soon rot off and need repairing. Besides there is less risk of fire, and the sand will not freeze so readily in winter in a brick building as in a frame one. For a foundry of this kind the building need not be very strong, as there is little or no strain upon it. All that is necessary is to

warm weather, and closed when it rains or is cold. The foundry walls and beams should all be swept down and whitewashed at least once a year, and a foundry that is poorly lighted should be whitewashed often. A molder will put up more work in a well-lighted foundry than he can in a dark one, and he will make a better quality of work and have less discount.

The next important thing to be considered is the arrangement of the molding floors and gangways. In stove founding the molten iron is all carried in hand ladles from the cupola to the molds. The cupola should therefore be situated where it will be easiest of access from all parts of the foundry, and good wide gangways should lead from it to the molding floor of each molder. The gangways should be paved with brick or some other hard material, for if they are not paved they soon get full of hills and hollows, which makes the carrying of the molten iron more laborious as well as more dangerous. The arrangement of gangways varies according to the size and shape of the foundry and the mode of working adopted in the region where it is located. I

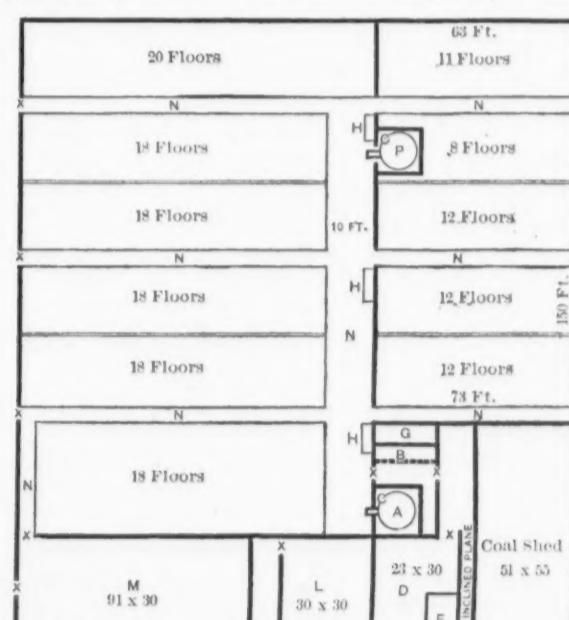


Practical Foundry.—Fig. 17.—Floor Plan of A. Bradley & Co.'s Stove Foundry.

make the walls or frame heavy enough to support the roof, which should rest entirely upon them, so as to give free access to all parts of the foundry without the necessity of dodging around a lot of pillars or posts. A stove foundry requires to be lighter and better ventilated than any other kind of foundry, for the blacking which molders use to make the sand scale of the casting is dusted on the molds through a very fine muslin bag, making a great deal of dust. In a foundry where 25 or 50 molders are employed there are always some of them shaking blacking, and if the building is poorly ventilated this black dust will get so thick that the molders can scarcely see through it. Moreover, in casting and shaking out stove plate, more dust and steam are made than in any other kind of casting, for the large surface of the plate very rapidly dries the sand on both sides of it, and the plate also cools very quickly, so that unless it be taken out of the sand while it is warm, the thin scale of sand that has been dried draws dampness from the body of the sand, causing the plate to rust. In order to have a fine surface on the plate it must be taken out of the sand while hot, an operation which produces a great deal of dust and steam.

A large ventilator should be put on the roof the full length of the foundry, a roof with a steep pitch being better than a flat

give below the floor plans of two large stove foundries—one located in the eastern and the other in the western part of the country. In Fig. 17 is shown the floor plan of A. Bradley & Co.'s large stove foundry at Pittsburgh, Pa. Here only one large cupola is used, this being situated near the center of the foundry, as indicated by A. Under and back of it is a pit B for removing the dump. One large gangway 8 or 10 feet wide runs through the middle of the foundry throughout its entire length, and on each side of it are the molding floors. In Pittsburgh, and in most of the western foundries, two molders work on one sand heap—one on each side of it—and each puts up only one row of flasks. Each molding floor, or the molding floor for each sand heap, is 13 feet wide by 40 or 50 long, and in this foundry the end of each sand heap runs to the gangway, so that all the floors are connected with it. The main gangway is paved with brick, and it is a railroad track upon which runs a small car for removing the castings and gates from the foundry to the scratch room. In this foundry there are only two doors—one large one at the end of the gangway and a stock door at the back of the cupola, on a level with the cupola scaffold. This is one of the best arranged and most convenient foundries in the West. In the model foundry lately erected by Francis



A. Cupolas, 6 feet Shell.
B. Pig Bed for Over Iron.
C. Cupola Pit.
D. Mill Room.
E. Elevator.
F. Inclined Plane to Returned Empty Barrows.
G. Ladle Room.
H. Water Tanks.
I. Engine and Boiler Room.
M. Scratch Room.
N. Gangway, 6 Feet Wide.—Main Gangway 10 Feet Wide.
P. Cupola, 6 Foot Shell, in new Addition to Main Building.

In this figure the heavy lines represent the outside and partition walls, the light lines, the sand strips between the gangways and floors, and the light double lines the racks between doors on which follow boards are laid.

Practical Foundry.—Fig. 18.—Floor Plan of Perry & Co.'s New Stove Foundry.

roof, as the steam and dust will escape through the ventilator more rapidly with the former. The side walls of a stove foundry should be at least 14 feet high, so as to give the dust and steam a good opportunity to escape rapidly.

The next important thing to be considered is plenty of light, for stove work is very fine work, and the least speck of loose sand left in the mold often condemns the casting. If the foundry be not well lighted the molder cannot see when a mold is clear, and many castings will be condemned on account of sand holes. Almost one-half of the foundry walls should be windows, and long, narrow windows, extending almost from the floor to the roof, are better than short, wide ones, as they give a more even light, while with the latter one part of a mold may be shaded by the other. A top light is better for this kind of work than a side light, and for this reason the sides of the ventilator should be arranged with ropes, so that they can be opened when a casting is being made, or in

Buckwalter & Co., at Royer's Ford, Pa., the floor plan is the same as in Bradley's foundry. In Fig. 18 is shown the floor plan of a large stove foundry lately erected by Perry & Co., at Sing Sing, N. Y. The main building is 126 x 176 feet and contains 110 floors, 6½ x 25 feet each. The addition is 63 and 73 x 150 feet, and contains 55 floors of the same size, making a total of 165 molding floors. This foundry is arranged to have the scratch room, engine and boiler room, coal shed, ladle oven and molding room all under the same roof, and the floor of the molding room is arranged to suit the Eastern style of working. In this only one molder works on a sand heap, putting up two or more rows of flasks. The molder does not require as long a floor as if he put up only one row of flasks. The average molding floor for the Eastern style of working is 6½ feet wide by 25 feet long. For these short floors more gangways are required, in order that each floor may be reached without having to cross another.

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A Trades Union Secretary on Practical Study for Workmen.

Mr. R. Knight, the general secretary of the Boilermakers and Iron Shipbuilders Society, has just published for private circulation a book entitled the "Practical Boilermaker, Iron Shipbuilder and Mast maker," which contains a mass of practical information especially valuable to workmen in the iron trade. In the preface to his work Mr. Knight offers words of sound advice, which are deserving the serious consideration of all workmen anxious to give to their respective branches of industry that practical study so essential in these times of constant progress and keen competition. After urging upon young men who want to become good mechanics that they can only rise to that position by striving for it by patient study and hard work, Mr. Knight proceeds:

"I am aware that the gradual development of capital, the absorption of small masters by large employers, a general breakdown of the apprenticeship system, the introduction of machinery, the sub-divisions of labor, and the constant hurry and drive of modern industrial employment, have all tended to make it most difficult for the young men of the present day engaged in skilled labor to acquire anything like a competent knowledge of their particular trades. It is almost impossible, as a rule, for a young beginner to apply any scientific knowledge he may have gained in the workshop, and the workshop is not the place in the present day where a young man can possibly learn a great deal connected with the trade with which it is most important he should be thoroughly acquainted. The question arises, then, what is the remedy for this? One of the courses I would strongly recommend to all those who want to acquire a better knowledge than they already possess of their trade is the following: Get the best books that you can which treat of the subject, and carefully study the same in your quiet hours after the day's work is done. Purchase a few sheets of card board and a few drawing instruments, then carefully strike out the diagrams. [And in his book Mr. Knight gives a large number of useful diagrams, the accuracy of which he has tested either at the workshop or at home.] First the drawings should be in flat, then they should be cut out, and formed into models. By such method the student would see how to do the actual work as well as read about it, and the principle of the whole would be so impressed upon the mind that it would not easily be forgotten."

Mr. Knight adds that he pursued studies according to this plan for many years, and found them of the greatest benefit. If the plan were tried it would be found of immense help, both to arouse interest and to fix the mind on the subject under consideration. In fact, the student would find it a pleasure to pursue his studies when he became acquainted with the principles which underlie the correct method of marking out his work, to know in fact the "reason why" it has to be done in this or that way, and not in another. It would not only help to make him a workman worth more to his employer, but it would make him something more than a machine, enabling him to take both a pride and an intelligent interest in the work on which he was engaged.

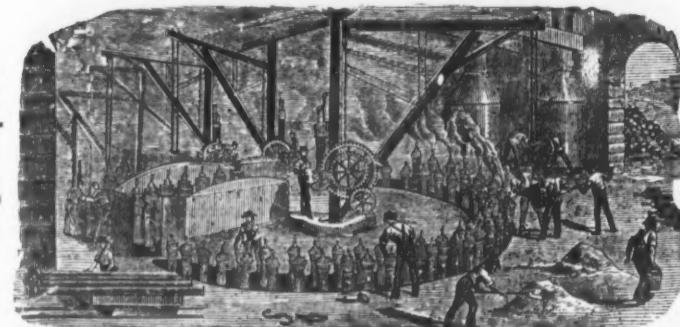
Brisbane, Australia, has its white elephant, the Victoria swing bridge, an iron structure which spans the river and connects the city with a straggling village known as South Brisbane. Ipswich is a town at the head of the navigable part of the river, about 25 miles west of Brisbane; its population is about 8000, less than one-third of the people in Brisbane. The Ipswich folk, however, thought that their town ought to be the capital, and when Brisbane arranged for an iron bridge over the river, Ipswich regarded it as a ruse to get a barrier across which would intercept the shipping going up to Ipswich. The fact is, the river is so shallow above the bridge that only small craft drawing but little water can ascend to Ipswich, and to deepen the rocky bed of the river for 25 miles would be an undertaking second only in magnitude to the Suez Canal. But Ipswich remained implacable, and so a swing bridge was constructed at enormous cost. The Marquis of Normanby formally opened the bridge on June, 1874, and the "swing" has been opened once since to see if it was in working order. Ipswich was pacified, and the people have to pay the interest on \$600,000, the cost of the bridge: 1190 tons of cast and 911 tons of wrought iron were used in constructing the Victoria bridge, which was manufactured and erected by Messrs. Feto, Brassey & Betts, of Birkenhead, from the designs of Messrs. Robinson & L'Anson, of Darlington. The distance between abutments is 1013 feet, and the entire length of the bridge is 1080 feet. There are 13 spans, viz., a double armed swing span of 170 feet, 9 spans of 82 feet, and two spans of 52 feet 6 inches. Double columns of cast-iron cylinders form the piers, on which rest lattice girders 9 feet deep. The roadway between the girders is 30 feet clear, and a footway 6 feet wide, supported by cantilevers, is carried along each side of the bridge level with the roadway. The bridge was commenced in 1863, and was not completed until 11 years later. The works were entirely suspended for a long period, the ironwork fell into the river, and there seemed to have found its last resting place, and the engineer, Mr. Thomas Oldham, died. At last litigation was ended, Mr. J. R. Jones was appointed superintending engineer, and the work was re-commenced and completed six years since.

The new British steamer Conventina, which lately discharged a cargo of 2200 tons Spanish iron ore from Pernam at Philadelphia, is a novelty in construction. Her keel is full 3 x 6 feet, which gives two solid bottoms, and between these are carried the ballast tanks. The point to be made in this improved plan is that, in the event of her going ashore, she is not liable to total damages, since, if the first bottom goes, she is still a whole ship. The Conventina was built by the Palmer Iron Shipbuilding and Engine Works, Newcastle-on-Tyne,



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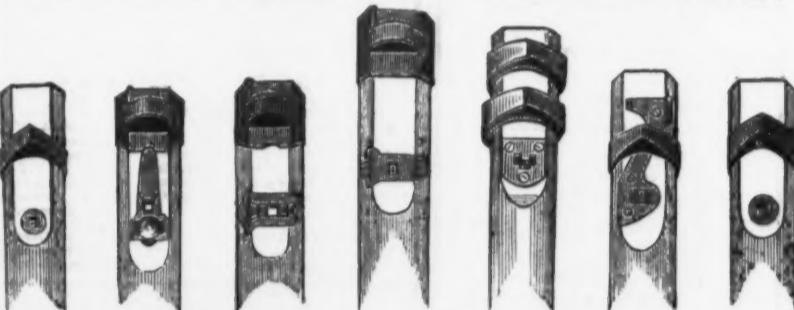
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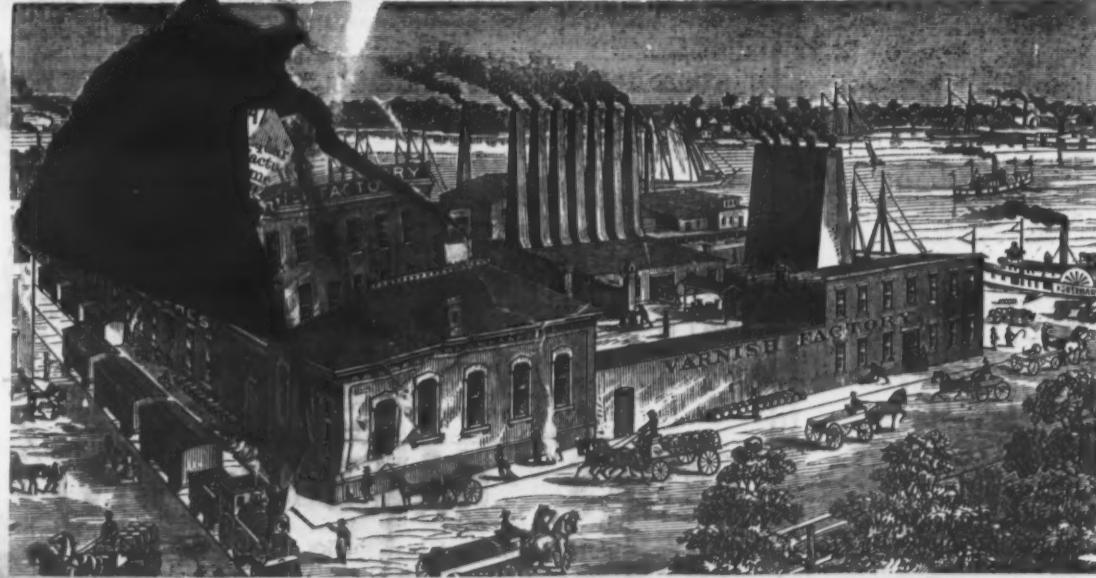
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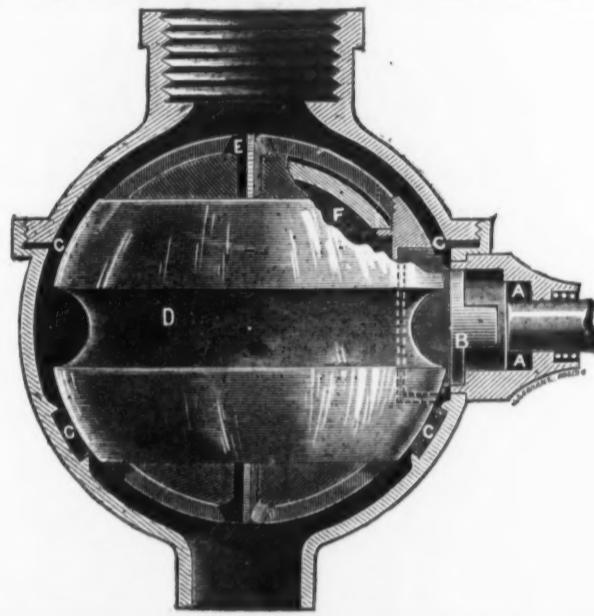
Improved Reversible Filter.

The accompanying cut illustrates what is known to the trade as Crocker's Reversible Self-Packing and Self-Cleansing Filter, an entirely new article, having been patented within the present year, which is manufactured by the Crocker Filter Company, 174 High street, Boston, Mass. It differs from all other reversible or revolving filters in several important particulars, among which may be mentioned the manner of packing the ball and outer case, indicated by C C in the engraving; the manner of holding the ball containing the filtering material; the self-packing stem or handle, indicated by A A in the engraving; the construction of the strainers E, and the manner of putting them into the ball. Among the reasons why this filter is superior to others, the manufacturers mention the following: The manner of packing at the bottom, in combination with the manner of holding the ball containing the filtering material, with a loose joint between the same and the reversing handle, makes it certain that there will be no leakage around the ball. The pressure of water seats the ball firmly in its position. The filter will always reverse as easily as when first put into use, which insures thorough cleansing at all times. The stem or handle for reversing the ball is so made and packed that the pressure of the water serves to make it tight, thus avoiding the annoyance of leakage at this point. The strainers screw into the ball, and are so made that the water is divided into four streams as it passes into the ball, thus securing thorough circulation and preventing boring through

a protectionist policy for that region, which will attract thither Northern capital and population, will be one of the first movements of this administration for breaking the "solid South" and disrupting for ever the Democratic party.

The South, while rapidly recovering from the effects of the war which devastated its country and revolutionized its labor system, can produce all the semi-tropical products of sugar, rice, tobacco, tea, and (in Florida) coffee, as well as wine and fruits which the vast region north of it can consume. Its freed men have to-day a competition in sugar, coffee, rice, and tobacco, &c., in foreign slave labor. Again, the needs of the war promoted the growth of manufacture of articles of prime necessity. Cotton mills have especially increased and proved profitable, till the whole country is dotted with small factories unknown before the war, and one of the results likely to follow this new-born industrial tendency is the manufacture into coarse yarns on the spot of the raw cotton which now so expensively finds its way to foreign spinning jennies.

You will thus perceive the elements of a strong party of protection in the South, and I think the time is not far distant when the South will be more protectionist than the North, where some manufacturers are already beginning to find that overprotection has but stimulated home competition, and that they have now to look to foreign markets for their surplus wares. Protection against foreign slave, as well as pauper, labor; protection to growing Southern industries and cultures, which shall attract capital and immigration and fill up a coun-



SECTIONAL VIEW THROUGH CROCKER'S IMPROVED REVERSIBLE FILTER.

the center. The wire netting is so secured to the framework as to be strengthened and protected thereby, and is removed with it by a wrench which accompanies the filter, thus rendering the matter of refilling very easy for even inexperienced persons. The filter in all particulars is thoroughly made, and the material with which it is filled is the best for the purpose. Material for refilling can always be obtained from the manufacturers.

Two sizes of the filter are made for ordinary housework, the cut showing in section the full size of the smaller one. Besides these sizes, which may be called faucet filters, the same principles and construction are applied to filters ranging from 8 to 30 inches in diameter, which are suited to all positions for which filters may be required, including the supply pipes of steam boilers. They are well adapted to use by paper manufacturers and bleachers, and in dye houses, laundries and other establishments where impurities in the water supply are objectionable. All the sizes are so constructed as to be cleaned without removing, the same as the faucet filters.

Protection as a Future Political Issue.

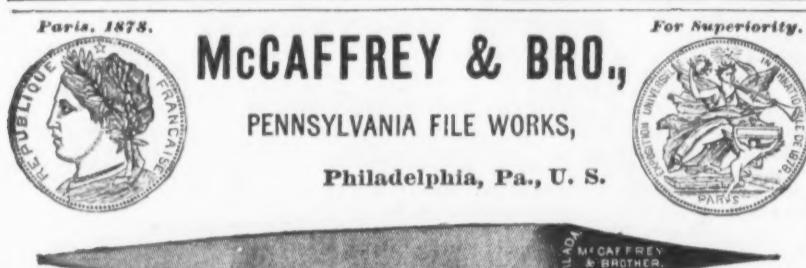
If the English papers do not presently understand the position of this country with regard to free trade, it will not be because they have not had the facts laid clearly before them. For example, in a recent issue of the London Times, we find a letter written from Brussels by a correspondent who evidently understands the position of affairs in this country very thoroughly. Commenting on a recent editorial in that journal, the correspondent says:

While it is true, as you state, that the free-trade policy of the Democrats meets the strongest opposition in the States devoted to manufacturing interests, the agricultural community of the West are by no means opposed to protection, as is implied. The farmers of that region are growing in the conviction that protection to manufacturing interests secures them permanent home markets, home consumers, as against the uncertain markets of Europe, dependent on good or bad crops; that the constant, assured supply of New England (which does not raise wheat enough for starch for its mills) is as good, if not better, for their interests than the uncertain demand of Old England, with the granaries of Europe to compete with; and hence, to the surprise of political economists on this side the Atlantic, great Western States have favored the party of protection and will continue to do so; and what protection has done directly for agriculture may be instanced in one among other products—wine. California last year produced 30,000,000 gallons, and is to day an exporter of its strong wine to Europe, where it serves to manufacture the "French" article. But it is to the South—which, as you say, as producing "only raw materials, has always been essentially a free trade community"—I wish to call attention. I think I may safely assert that the Southern States are rapidly becoming protectionists, that their interests are specially dependent upon protection, and that with the accession of General Garfield

The Fire in Keely Run Colliery.—The Pottsville Miners' Journal says that the Schuylkill county Court of Common Pleas has made the following order in the case of the fire in the Keely Run Colliery: A. B. Cochran, Samuel Gray and John R. Hoffman are hereby appointed to make examinations and report, under oath, their conclusion and answers to the following questions: 1. Can Keely Run Colliery be flooded with water in the upper or first level, in such manner as to reach the fire now existing there, without danger to the lives of the persons employed in the colliery of Heckscher & Co? 2. Has the first or upper level of the Keely Run Colliery already been flooded? If so, to what extent, and what has been the effect upon the colliery of Heckscher & Co? The examiners are invited to accompany their report with such suggestions as they may deem pertinent and proper. The above-named parties, plaintiff and defendant, have permission to send their own engineers with the examiners hereby appointed, if they so desire. The examiners hereby appointed are requested to report to the court as soon as possible and in writing. The parties enjoined by the preliminary injunction heretofore granted, are hereby directed to discontinue the flooding of the Keely Run Colliery or the turning of any water into said mine for such purpose, until further order of the court, this being the object of the said injunction.

American cotton belting is now, it appears, obtaining more appreciation in England. Mr. Kirkaldy, the well-known expert, has made some tests recently, and has found that a 3½-inch cotton belt broke under a load of 4,167 pounds, while an English leather belt 4 inches wide was broken at 2,000 pounds.

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Superior Hand-Cut
FILES AND RASPS,
MADE FROM IMPORTED STEEL. EVERY FILE WARRANTED.
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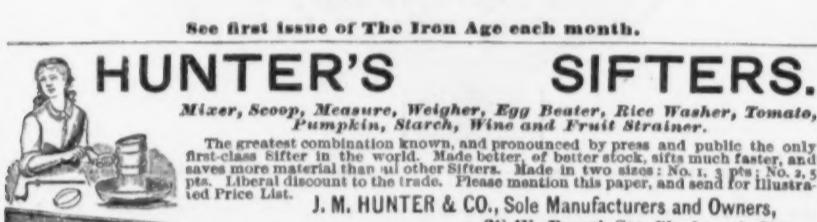
Manufacture and keep in stock a full line of FILES and RASPS only, for which we claim special advantages over the ordinary goods, and ask domestic and foreign buyers to allow us to compete for their trade.

Superiority acknowledged wherever used, sold or exhibited.

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\$30 per Dozen
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Cross or Crossing,
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Drill,
Feather Edge,
Finishing,
Flat,
Flat Equaling,
Flat Wood,
Gang-Edger,
Ginsaw,
Gulleting,
Half-Round,
Half-Round Wood,
Hand,
Hand Equaling,
Handsaw Blunt,
Handsaw (Double-Ender),
Handsaw Taper, single cut,
Handsaw Taper, double cut,
Handsaw Taper, slim,
High Back,
Hook-Tooth,
Knife,
Knife Blunt,
Lead Float,
Lightning,
Machine Mill,
Mill,
Mill Blunt,
Mill Pointing,
Pillar,
Pitsaw,
Reaper,
Roller,
Round,
Round Blunt,
Slotting,
Slim Handsaw Taper,
Square,
Square Blunt,
Square Equaling Files,
Stave Saw,
Three-Square Files,
Tumbler Files,
Union Cut,
Warding Files,
Warding Blunt File,
Warding Round Edge File.

RASPS.

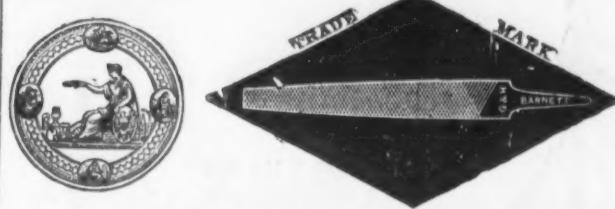
Baker's,
Beveled Edge,
Bread,
Cabinet,
File, Flat and Half Round,
Flat Shoe,
Flat Wood,
Half-Round Shoe,
Half-Round Wood,
Horse, Plain and Tanged,
Horse Mouth,
Jig,
Oval or French Shoe,
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Ketcham's Pat. Metallic Sieves.

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American Screw Co., Gimlet Pointed Screws, &c.

Romer & Co., Brass Locks, &c.

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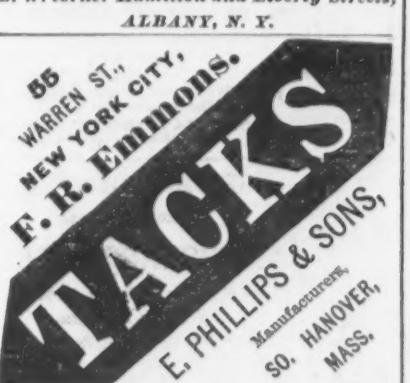
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4739 Paul St., Frankford, Philadelphia, Pa.,
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Hardware Novelties, Glass Cutters, &c.

Hardware Novelties, Glass Cutters, &c.

The Chemical Composition of Boiler Incrustations.

BY W. IVISON MACADAM.

For the last three years I have been engaged in an investigation as to the chemical composition of boiler incrustations, as also of the composition of the waters used for steam purposes, and of the materials employed as anti-incrustators.

The subject is one of much importance to steam users, and although, from time to time, various analyses and reports on the composition of boiler incrustations have been read before the learned societies, yet I am not aware that any attempt has, before this, been made to give a series of such an extent as to warrant the drawing of conclusions of any practical use and certainty.

When water is brought to the boiling point, either with or without ether than atmospheric pressure, and maintained at that temperature, it tends more or less quickly to deposit the saline matters it contains in solution. These saline deposits are of two classes. The first series contain all those incrustations which are composed of substances insoluble in water, but soluble in an excess of carbonic acid gas. This class consists principally of carbonates, those of lime and magnesia being the most common. The second series contain much sulphate of lime, which is present in a soluble condition in the feed water.

Carbonate Class.—Waters commence depositing carbonates immediately on being heated, and continue doing so as long as there is any free carbonic acid gas contained in the water. The incrustations of this class are hard, firm cakes, which are difficult to remove from the boiler, and usually require to be chipped off with a hammer and chisel. The following analyses will show the chemical composition, the results being calculated to percentages:

| BOILER INCRASTATIONS—CARBONATE CLASS (NO ANTI-INCRASTATOR USED). | | District from which Sample was Obtained. | |
|--|----------|--|-----------|
| No. 1 | No. 2 | No. 3 | No. 4 |
| Dunbar. | Selkirk. | Slough. | Carlisle. |
| Oxide of iron..... | 7.45 | 8.36 | 8.55 |
| Alumina..... | 22.16 | 21.94 | 20.93 |
| Carbonate of lime..... | 31.64 | 31.58 | 31.56 |
| Sulphate of lime..... | 50.04 | 50.84 | 50.86 |
| Carbonate of magnesia..... | 3.11 | 3.16 | 3.15 |
| Sodium salts, &c..... | 16.94 | 8.56 | 4.88 |
| Magnesia..... | 7.78 | 3.03 | 1.32 |
| Total..... | 100.03 | 99.88 | 99.84 |
| Source of water supply..... | Well. | River. | Spring. |

which is present in greatest amount is the calcic sulphate, and that carbonate of lime, carbonate of magnesia, and iron oxide, are found in less proportions.

WATERS.

The waters most usually employed in the steam boilers throughout the country are hard in quality. This probably arises from the fact that boilers are generally to be found in towns and populous places which have introduced a water supply from a distance. This supply is not, as a rule, so abundant as to admit of its being used for other than domestic purposes; and even where an unlimited supply is at hand, the cost is such as to debar its general adoption. Manufacturers are, therefore, compelled to go to other sources for their supplies, and recourse is had to wells. These well are generally hard in nature, and are of two distinct classes, (1) those which contain carbonates, and are termed temporary hard waters, and (2) those having sulphates in solution, and forming what are called permanently hard waters. It is not uncommon to employ dirty or sewage waters, and also pit waters. The latter class of waters often contain much iron and alumina as acid sulphates, and are most injurious to boilers; for, besides forming hard incrustations, they act upon the iron of the boiler plates, gradually eating them through. Sewage waters are much esteemed by practical engineers, as they are said to scour or clean the boilers, a property which is due to the oily matters they hold in suspension, and the presence of which renders their use inadvisable. Much will also be effected by the organic substances in solution and suspension, which, mixing with the deposit as it is precipitated, do not permit of the formation of a hard scale. They give generally a soft mass or powder, which is readily removed from the boiler.

The following are the analyses of those various classes of water, the results being calculated in grains per imperial gallon:

STEAM BOILER SOFT WATER.

| Grains in One Imperial Gallon. | | District from which Sample was Obtained. | |
|--------------------------------|-----------------------|--|---------|
| No. 17. | No. 18. | No. 19. | No. 20. |
| Dunbar. | Crailiegh. | Edinburgh. | Slough. |
| Total saline matter..... | 15.68 | 6.00 | 50.24 |
| Total organic matter..... | 3.20 | 2.04 | 11.15 |
| Total solid matter..... | 18.88 | 7.04 | 67.33 |
| Chlorine..... | 2.5 | 2.8 | 2.75 |
| Carbonate of lime..... | 11.8 | 21.94 | 2.75 |
| Sulphate of lime..... | 1.03 | 10.71 | 7.14 |
| Total..... | 100.03 | 99.84 | 99.71 |
| Source of supply..... | Town supply and well. | Well. | Well. |

These results show the water to be of good quality for steam purposes.

STEAM BOILER HARD WATER FROM WELL.

| Grains in One Imperial Gallon. | | District from which Sample was Obtained. | |
|--------------------------------|-------------------|--|----------------|
| No. 22. | No. 23. | No. 24. | No. 25. |
| Whitehill. | Graniton. | Whitehill. | Dorton. |
| Total saline matter..... | 24.08 | 10.88 | 30.48 |
| Total organic matter..... | 2.88 | 6.08 | 3.20 |
| Total solid matter..... | 26.96 | 31.68 | 34.68 |
| Chlorine..... | 1.5 | 2.75 | 2.0 |
| Carbonate of lime..... | 18.31 | 3.42 | 19.95 |
| Sulphate of lime..... | 4.31 | 8.43 | 18.55 |
| Total..... | 94.31 | 4.05 | 14.33 |
| Source of supply..... | Pits and surface. | Pits and surface. | Pits and burn. |

From the above analyses it will be seen that the principal ingredient is carbonate of lime, while carbonate of magnesia and sulphate of lime are present in smaller proportions. The iron oxide is also small in amount, showing little corroding action on the boiler plates.

Sulphate Class.—The incrustations belonging to this series contain, as their characteristic element, sulphate of lime. The waters which contain this salt do not, when first heated, deposit, but as they become more and more concentrated by the volatilization of the steam, the water becomes unable to retain the saline matters in solution, and they are, therefore, gradually deposited. The series form tough, hard cakes, which are with difficulty removed from the boilers. The following analyses will show the composition calculated to percentages:

| BOILER INCRASTATIONS—SULPHATE CLASS (NO ANTI-INCRASTATOR USED). | | District from which Sample was Obtained. | |
|---|-------------------|--|------------------------|
| No. 6. | No. 7. | No. 8. | No. 9. |
| Prestonport. | Orton. | Whitehill. | Carlisle. |
| Oxide of iron..... | 4.54 | 3.56 | 2.92 |
| Alumina..... | 1.28 | 2.16 | 17.31 |
| Carbonate of lime..... | 23.16 | 23.16 | 16.43 |
| Sulphate of lime..... | 10.30 | 15.04 | 17.33 |
| Sodium salts, &c..... | 78.10 | 53.76 | 53.94 |
| Magnesia..... | 3.11 | 0.54 | 0.44 |
| Organic matters..... | 3.11 | 4.33 | 0.24 |
| Total..... | 99.68 | 99.77 | 100.03 |
| Source of water supply..... | Pits and surface. | Quarry and salt water. | Quarry and salt water. |

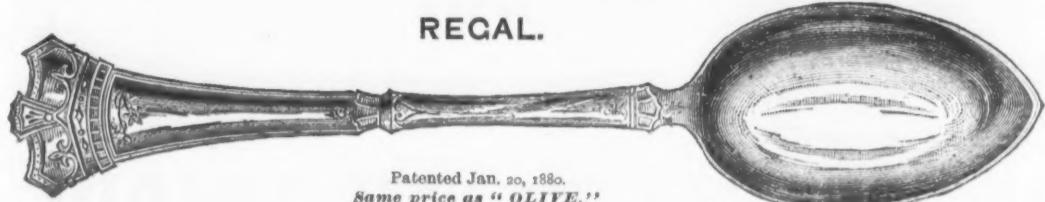
| BOILER INCRASTATIONS—SULPHATE CLASS (NO ANTI-INCRASTATOR USED). | | District from which Sample was Obtained. | |
| --- | --- | --- | --- |
| No. 10. | No. 11. | No. 12. | No. 13. |

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Superior Silver-Plated Table Ware.

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Same price as "OLIVE."

SARATOGA.



Same price as "OLIVE."

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Finest Quality Silver-Plated Spoons, Forks, Knives, &c.



NOTICE.—We guarantee the base of our Spoons, Forks, &c., to be full 18 per cent. Nickel Silver, and extra heavily plated with pure Silver. Our goods are all hand burnished, and are first-class in every respect. We pack our Spoons and Forks one dozen in each box.

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FACTORIES,
NEW YORK.
WATERBURY, CONN.
18 FEDERAL ST.,
FACTORY,
BOSTON.

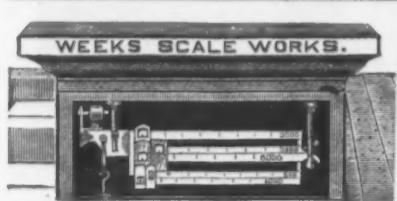
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REVOLVERS, BREECH-LOADING GUNS,
TABLE CUTLERY, BUTCHER KNIVES,
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AMERICAN BOLT CO., Lowell, Mass.,
MANUFACTURERS OF
**Bolts, Nuts, Washers, Chain Links, Car
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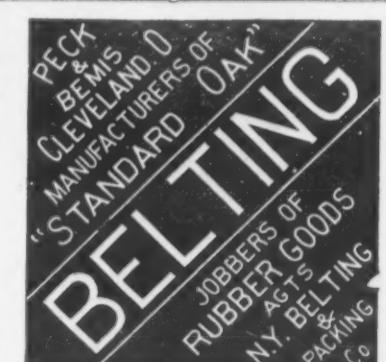


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Combination Beam..... 70.00

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ATLANTIC SCREW WORKS,
and Agent for the
FLORENCE TACK CO.Wood Screws, Tacks, Nails, &c.,
of every description, of the best quality,
at the lowest rates.GEO. H. CREED,
SHIP CHANDLERY,
103 Reade Street, New York,
Manufacturers of and Wholesale Dealers inCotton and "Long Flax" Sail Duck,
Cotton and Linen Hawsers,
Creed's Patent Ships' Clews, Hoffman's Wire Rope
Splices, Agent for Raymond's American Crane Oil
for lubricating Cylinders and Valves.A. F. PIKE,
Pike Station, - New Hampshire,
Manufacturer and Wholesale Dealer in

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Factories at Pike Station, N. H.,
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Indian Pond (Red End),
Premium, Union,
White Mountain,
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Green Mountain,
Black Diamond,
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Stones made, labeled and branded in any style de-

sired. PRICE AND QUALITY GUARANTEED. All the above

brands are of clear, keen grit and will not glaze.

"VALENTINE'S" PATENT

FELT WEATHER STRIP.

For keeping out Cold, Wind and Dust. The best
and durable and cheapest strip in the market. It is
not affected by the weather, does not become hard
and brittle in cold or melt in warm weather. Sam-
ples and Price Lists sent free by mail.W. T. VALENTINE,
Sole Manuf'r and Patentee, Albany, N. Y.

the locality from which they have been obtained.

STEAM BOILER WATERS.—SEWAGE IMPREGNATED.

| Grains in One Imperial Gallon. | District from which Sample was Obtained. |
|--------------------------------|--|
| No. 20. Portsmouth. | No. 20. Edinburgh. |
| No. 31. Kinghorn. | |
| Total saline matter..... | 15.36 |
| Total organic matter..... | 6.40 |
| Total solid matter..... | 21.76 |
| Chlorine..... | 3.7 |
| Carbonate of lime..... | 6.16 |
| Sulphate of lime..... | 16.00 |
| Source of supply..... | Burn. Burn. Leach. |

ANTI INCRUSTATORS.

All waters, whether hard or soft, when employed for steam purposes, give a deposit or incrustation, which falls to the bottom and adheres firmly to the boiler plates. These incrustations cause a very great loss of heat, amounting, in some cases, to nearly 30 per cent. of the fuel used, and when allowed to remain, soon make the plates of the boiler twisted and broken, besides very often being the cause of disastrous explosions and great loss of life and property. Many substances are used to prevent the incrusting of the plates of boilers, some of which profess to retain the salts in solution, while others act mechanically. As to the first of these classes, a material which can act on the hard, firm incrustation, and render it soluble, will most likely also eat into the boiler, and thus cause more damage than good, and, even if successful, would lead to priming. The second series, however, play an important part. Their object is to compel the sediment of water to be given off in such a state that it shall not adhere to the bottom or sides of the boiler or tubes. This is a very large class, and contains many members widely differing from each other in chemical composition and characters. For convenience of consideration, they can be divided into (1) saline, (2) fatty, (3) organic and gelatinous, and (4) paraffine and paraffine products.

Saline Compositions.—The more commonly met with saline materials used as anti-incrustators are washing soda and soda ash. When these bodies are added to a water, the lime salts present in it are precipitated at once as carbonates, and form a dense white flocculent mass. The water, on boiling for some time, deposits a hard cake of incrustation which it is difficult to remove. The compositions consisting of carbonate of soda are many in number, and have special names according to the fancy of the vendor. One sample analyzed was colored with blue litmus. The following analyses are from incrustations where carbonate of soda is employed:

BOILER INCRUSTATIONS.—CARBONATE OF SODA EMPLOYED.

| Source of water supply..... | District from which Sample was Obtained. |
|-----------------------------|--|
| | No. 20. Portsmouth. |
| | No. 20. Edinburgh. |
| Total..... | 99.64 |
| Source of water supply..... | 99.64 |
| | No. 20. Well. |
| | No. 20. Fats. |
| | No. 20. Pits. |
| | No. 20. & Face water. |
| Total..... | 99.64 |

It will be observed that these analyses agree very nearly with those obtained from boilers using no anti-incrustator. The organic matter is in some of the cases higher, but the greatest difference is that, while the one is a hard scale very difficult to remove, the other is a soft mass readily cleaned away.

There it a class of anti-incrustators employed which contain a gelatinous body with a saline substance (generally washing soda). Such materials throw down the lime salts, and by their mechanical action tend to yield an incrustation not nearly so hard as the plain salts do. The following table shows the results of the analyses of incrustations from boilers employing this large class of mixtures:

BOILER INCRUSTATIONS.—MIXED GELATINOUS AND SALINE COMPOSITIONS EMPLOYED.

| Source of water supply..... | District from which Sample was Obtained. |
|-----------------------------|--|
| | No. 20. Well. |
| | No. 20. Water supply. |
| Total..... | 99.64 |

These results show a large amount of sulphate of soda, which has been formed by the carbonate of soda and the sulphates of the water interchanging acids, and becoming sulphate of soda and carbonate of lime.

Fatty Compositions.—In this series are included tallow and the fatty oils. The employment of tallow, although common, is attended with much danger, as is proved by the number of boiler explosions from this cause, the boilers showing, when examined, that quantities of the tallow have combined with the lime salts to form an insoluble lime soap, which adheres to the plates of the bottom and sides of the boilers, allowing the iron to be overheated, and causing the plate to be burned and twisted. Besides this, fatty acids are evolved, which attack the iron plates and gradually eat them through. This is readily observed from the analyses of incrustations of this class, which show a considerable proportion of iron:

BOILER INCRUSTATIONS—TALLOW EMPLOYED.

| Source of water supply..... | District from which Samples were obtained. |
|-----------------------------|--|
| | No. 20. Glasgow. |
| | No. 20. Fountainhall. |
| Total..... | 99.80 |

The employment of waste or condensed steam often leads to the introduction of tallow into boilers. The following analysis of a sediment from a condensed steam tank, shows the action of the tallow on brass or copper and iron, as well as the amount of oily matters carried over by steam:

SEDIMENT FROM CONDENSED STEAM TANK.

(District from which Sample was taken—No. 37.
Sheffield.)

| Source of water supply..... | District from which Sample was obtained. |
|-----------------------------|--|
| Oily matters..... | 57.47 |
| Source of water supply..... | 57.47 |
| | Well. |
| Total..... | 99.80 |

The results of the analyses of sediments from such boilers are as below:

BOILER INCRUSTATIONS—PARAFFINE OIL EMPLOYED.

District from which Sample was obtained.

No. 20.
Glasgow.No. 20.
Fountainhall.No. 20.
Dunelm.

Total.....

98.94

99.92

99.89

Source of water supply.....

Well.

Well.

Well.

Sample No. 61, from Dunelm, had tallow in-

District from which Sample was Obtained.

District from which Sample was Obtained.

District from which Sample was Obtained.

H. D. SMITH & CO., Plantsville, Conn.,

Manufacturers of the

BEST QUALITY CARRIAGE MAKERS' HARDWARE.

Manufacture the Largest Variety of Forged Carriage Irons of Best Material and Workmanship.

PRICES LOW FOR QUALITY OF WORK FURNISHED.

SEND FOR PRICE LIST.

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The Saranac Nails are hammered hot and the finishing and pointing are done cold. Quality is fully guaranteed. For sale by all leading iron and hardware houses.

S. P. BOWEN, President and Treasurer.

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J. W. LYNDE, Secretary.

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SARANAC HORSE NAILS,
Blued or Polished.
TERMS, CASH, WITHIN 60 DAYS.

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| Nos. | 5 | 6 | 7 | 8 | 9 | 10 |
| Cts. | 26 | 23 | 21 | 20 | 19 | 18 |

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PARKER'S and
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BREECH LOADING GUNS.

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Sole Manufacturers of

SKINNER'S PATENT COMBINATION CHUCK. Universal, Independent and Eccentric.

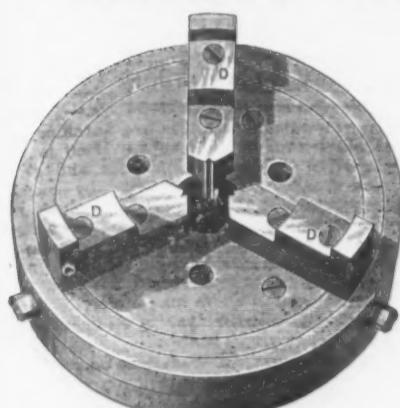


Fig. 1.—Front View.



Fig. 2.—Back View.

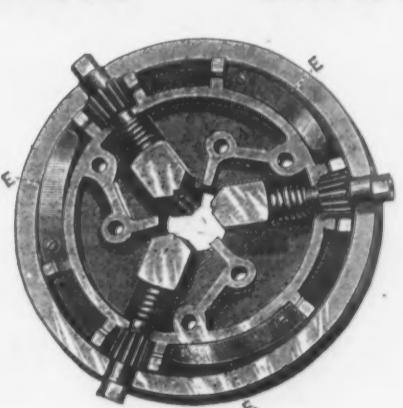


Fig. 3.—Front Plate.



Fig. 4.—Back Plate.

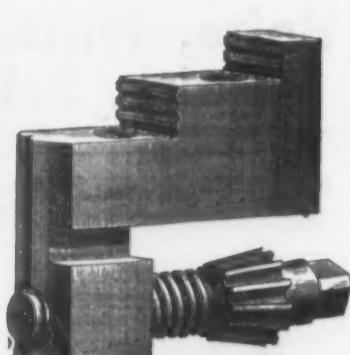


Fig. 7.—Patent Jaw.

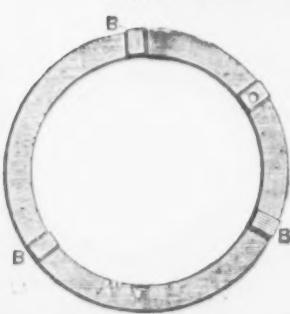


Fig. 5.—Cam Ring.

This Chuck is Universal, Independent and Eccentric, and was patented June 24 and November 18, 1879. We are determined that this Chuck shall be the best in the market. Believing that our customers do not want an inferior article, and with the improvements, as shown in the cuts, we have no hesitation in saying **Ours is the Best Chuck Manufactured**, and we **Guarantee Every Chuck of this make perfect in every respect.** All parts will be made interchangeable, and in case repairs become necessary, we can furnish the part needed without the chuck being returned to us, saving much time and expense, especially on **Goods sold out of the country.** By sliding the Stud C (Fig. 2) the Chuck can instantly be changed from Universal to Independent, and vice versa. Whenever, by use or from any cause, the faces of the jaws are found out of true, the several faces in the different jaws, which should be in the same plane, can be readily adjusted by screwing out the screws D D D (Fig. 1) until the projecting heads are in the same plane, at right angles to the axis. Please send for full descriptive circular and prices.

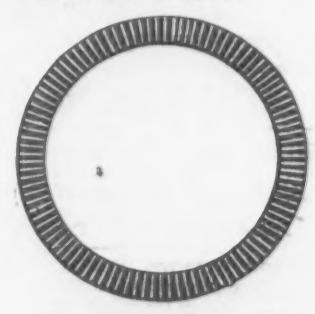


Fig. 6.—Circular Rack.

UNION MFG. CO., New Britain, Conn.
Warehouse, 96 Chambers Street, New York.



SPENCER & UNDERHILL,

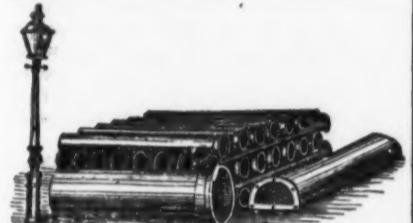
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400 CHESTNUT STREET.

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Patented March 13, 1877.

Trade Mark registered October 23, 1876.

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Making the

Strongest, Prettiest and Most Perfect Sled ever made.

Sold by all dealers.

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Manufacturers.

W. H. QUINN & CO., 70 Chambers St., New York Agents.

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Manufacturers of

R. R. Track Scales, Hay Scales, Coal Scales, Grain Scales, Platform Scales, Counter Scales, &c.

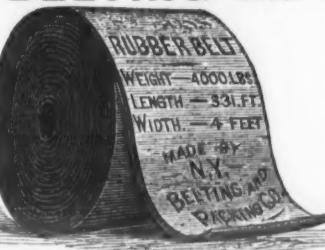
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Circular Woven-Seamless Antiseptic RUBBER LINED "CABLE" HOSE and "TEST" HOSE, Vulcanized Para Rubber and Carbolicized Duck, for the use of Steam and Hand Fire Engines, Force Pumps, Mills, Factories, Steamers, Ships, Hospitals, &c.

"TEST" HOSE. "CABLE" ANTISEPTIC

Emery Wheels and Packing.

Patented.

ORIGINAL Solid Vulcanite EMERY WHEELS

LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.

The properties of these Wheels are such that they can be used with great advantage and economy for cutting, grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, Slate, Marble, Glass, etc. These Wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools, Plows, Safes, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small Machinery of almost every description.

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Rubber Back Square Packing

BEST IN THE WORLD.

For Packing the Piston Rods & Valve Seats of Steam Engines & Pumps.

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B represents that part of the packing which, when in use, is in contact with the Piston rod. A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight, and yet creates but little friction.

This Packing is made in lengths of about 20 feet, and of all sizes from $\frac{1}{4}$ to 2 inches square.

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For Halls, Flooring, Stone and Iron Stairways, &c.

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This practical and indispensable article—especially for work where exposed to ice, snow, or slush—was first introduced by this company several years ago, and its real value is in being almost indestructible, when proper materials are used in its manufacture, whilst the cheap, inferior quality forced on the public by reckless imitators of our patent goods soon becomes brittle and crumbles to pieces. Address

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Pat. Jan. 26, 1869.

Pat. Jan. 26, 1869.

Pat. July, 1879.

Section of Emery Wheel showing Iron Center.

Emery Wheel.

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The Iron Age

AND

Metallurgical Review.

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Thirty-third Page.—Philadelphia and Pittsburgh Hardware and Metal Prices.

Thirty-fifth Page.—Boston Hardware and Metal Prices.

The stress laid upon the importance of better sea-coast defenses by the Chief of Engineers of the United States Army, is out of all proportion to the actual necessity to which it calls attention. It is natural for the soldier to magnify the importance of military preparation, and to see danger to the nation in every headland and sand bar not occupied with a fortress bristling with improved ordnance. A better protection than these could give us is found in our distance from neighbors at once formidable and hostile, in our disposition to avoid entangling foreign alliances, and in the loyalty of a people ever ready to rush to arms in defense of the country against foes without or within. Our last war taught us the value of canes, and we will quickly these could be thrown up in case of need. As to guns—well, we are behind Europe, but probably we can afford to stay so for the present.

It is just as well to let England waste millions of treasure annually in experimenting on guns, armor and projectiles, as to spend it ourselves. When she has found out all that is worth knowing, we shall be in a position to spend some money to advantage. Fortunately, the power to declare war rests with the civil and not with the military authorities. As against foreign war ships, torpedoes are a better defense than fortifications. Since they were introduced war vessels have not cruised around in hostile waters with the same freedom as formerly, and of late years navies have been of comparatively little use for aggressive purposes. During the Franco-German war, the navies of both powers lay idle in their respective waters. On the whole, we are not so badly soothed as the army engineers seem to be.

would advance on the strength of an increased demand, and the tax which protection wiped out would be reimposed by free trade. But the injury would not stop here. The mischief resulting from the destruction of a profitable and prosperous industry would be as far reaching as were the benefits of its prosperity.

This is the whole question in a few words. A duty imposed for revenue only is a tax on consumption as long as it stands, with no benefit to the consumer. A duty imposed for protection is a tax until protection has accomplished the industrial development it was designed to promote, and then it ceases to be a tax, because the imported article is displaced by the domestic, and the competition among domestic producers keeps the price down. The revenue duty merely adds so much to the national taxes, without in any way increasing the tax-paying power of a country. The protective duty sends the thrill of a new life through the national pulses, and, by creating wealth and giving an increased value to native resources, increases by so much the power of the people to bear taxation.

The whole argument in favor of a revenue tariff and against a protective tariff is utterly dishonest. We can understand and respect the views of a man who advocates free trade. His views may be impracticable, but he can give a reason for them which is intelligent. But if it be conceded that it is either necessary or desirable for a government to impose customs duties, no one can both honestly and intelligently maintain that it is not better to so adjust those duties that they shall result in incidental benefit to the country by increasing its production, adding to its wealth and enlarging its tax-paying ability.

The fundamental fallacy of the free-trade argument was pointed out some time ago in these columns. It is that the interests of a people as consumers are paramount to their interests as producers. This we deny, and the fact that every progressive and prosperous people produce more than they consume proves our position. But were it true that the individual has interests as a consumer which are more important than his interests as a producer, the argument would not justify a revenue tariff any more than it would a protective tariff, although it might be held to prove the wisdom of absolute free trade. But absolute free trade is something no country thinks of, much less Great Britain. Probably she is not in a position to profit by protective duties. Her manufacturers want labor cheap, and have no desire to see the masses of the people prosperous and comfortable if comfort and prosperity mean better wages. They must manufacture cheaply or not at all. But what may be good for England is not good for us; and we repeat that the movement in favor of the abandonment of protection and the substitution therefor of a tariff for revenue only, which was so emphatically and unmistakably rebuked by the people at the recent general election, seeks simply to betray American interests into the hands of British producers.

The Development of Mexico.

Those who are seeking to secure aid from capitalists in this country for the building of railroads in Mexico, have found a powerful ally in Gen. Grant. At a recent reunion in this city, Gen. Grant pleaded for increased importation facilities in quite an eloquent speech of exceptional length. Although inaccurate in some of its details, the argument was, on the whole, a sound one, placing the subject in a new light.

All who have visited our sister republic agree that her resources are both boundless and varied, and all concede that in the absence of any navigable rivers, the only means of opening out the country is by means of railways. There is, furthermore, little doubt that the trade created by a development of Mexican agricultural and mineral resources will be one of great and growing importance, that the country which aids chiefly in that development will secure the greatest share, and that no country is so favorably placed as our own in any efforts it may make to obtain the Mexican trade. Upon these grounds it is urged that nobody has so direct an interest and so fair a prospect of success in building railroads for the Mexicans as the capitalists of the United States. This is the view taken by Gen. Grant, and he distinctly and emphatically states that those who enter upon the undertaking must not look for any aid in the shape of subsidies from the government; in fact he claims that it would be better to do without them, even if they could be obtained. It has been a favorite argument to point to the rapid growth of agriculture and industry along new lines of road in the West as an instance of the effect of the extension of railways upon trade, and to draw from it the conclusion that similar results might be looked for in the case of Mexico also. We cannot see the force of this comparison. Circumstances were exceptionally favorable to the development of our Western States. There is not in Mexico the class of men who have turned the prairies into vast fields of corn and wheat. The docile, ignorant Mexican Indian may do well enough as a laborer working for 50 cents a day on the railway, but he will never play an important part in colonizing and developing the country opened out. Nor will a flood of immigration follow the extending line of road. Little can be hoped for from the great bulk of the population—the Indians—

who number nearly 7,000,000 out of a total population of 10,000,000.

Gen. Grant takes pains to deduce, from a history of Mexico during the present century, that her people have not until now had a fair chance to show their aptitude for business. He argues that it is a credit to them that they are not worse than they are. While it is only just to give the Mexicans credit for their success in expelling from their soil a well-organized army of invaders, and for shaking off the yoke of a rich and powerful priesthood, it cannot be denied that they have shown little talent for an enlightened self-government. Their political institutions are certainly not now calculated to inspire much confidence. Congress is swayed by violent and intolerant factions, and the central government has lost all control over those States which are not readily accessible. While, therefore, the country itself holds out tempting inducements, the bulk of the population, though industrious and peaceful, are lacking in enterprise. A considerable portion of the intelligent classes seek excitement and spoils in political brawls, and only a minority are active, pushing and intelligent business men.

These facts should not be lost sight of, and therefore it would appear reasonable to suppose that the best mode of approach is from a base line in this country. This is what is being done. Sonora, one of the northern states of the republic, is being opened out by a line connecting the port of Guayamas with the American system of railways, which will soon be materially strengthened by the completion of the Southern Pacific Railroad. This will open a state the mineral and agricultural wealth of which is well known, whose inhabitants are comparatively vigorous and enterprising, and are very little hampered by any changes going on in the capital. A steady and cautious progress southward, in proportion as the country is being developed, would be the safest and most economical method of bringing Mexico within the range of our industrial activity, and conferring upon both countries the benefits of a close and remunerative business intercourse.

or in the near future in this branch. Much has been said and written on this side latterly as to what ought and might be done here in it, but we are afraid it would be too late, even granting that our facilities in the way of material were as great. Iron shipbuilding has become a specialty in England, and has attained such perfection and such rapidity of execution that it will not be easy now for any other nation to obtain a foothold in this industry.

Checks for Small Payments.

There is no merchant whose customers are scattered over a large extent of country, who has not realized the need of some more convenient method of transmitting small and odd sums of money through the mails. The old fractional currency is well-nigh redeemed. It is unsafe to send bills for even dollars, and too bulky to use small coins for fractions of dollars. Checks can be sent where the party keeps an account, but the sender too frequently forgets to add the twenty-five cents demanded for collection, which, in most cases, is an outrageous and extortionate price to pay for the accommodation. True, money can be sent by post-office order or by registered letter, but it is troublesome to send for the order or letter, and in cases of small sums the charge of the post office is quite a percentage of the sum sent. What is needed is some safe, ready and inexpensive method of sending such small sums.

The London Cheque Bank provides such a method for Great Britain. This bank issues checks that are good for any amount up to a certain sum, say £1. For a book of one hundred such checks the buyer would make a deposit of £100. When the checks are returned to the bank the account is charged with the actual amount for which it is drawn, and when the hundred are returned the balance is subject to the draft of the depositor. Prof. Stanley Jevons, speaking of this bank, says:

Not only do people now draw very small checks in their own check books, but if they happen not to possess that luxury, they walk into a neighboring stationer's or draper's shop and ask for a Cheque Book, which is simply filled up and handed over in exchange for the money without more ado. This check may be posted to almost any part of the habitable world, and will be worth its inscribed value, for which most bankers, hotelkeepers and other business people will cash it, irrespective of advice notes and localities.

A bank of a somewhat similar character might be established in this country. One difficulty would be the extent of the country and the well-nigh impossibility of scattering the checks all over the country. A better way, it seems to us, would be through the post offices, using a method similar to that of the Cheque Bank. In all of the large cities and towns, at least, arrangements might be made to receive money on deposit and issue checks that would be good either at all post offices or at certain specified ones. In a word, the adoption of the Post Office Savings Bank system of England, with some modifications, would meet this want. We do not propose to discuss the details of the plan, but simply throw out the suggestion for thought.

A National Bankruptcy Law.

The movement originating in Boston last winter to secure the enactment of a general registry law is said to have acquired important support, and is to be pushed this winter with renewed vigor. A draft of the proposed law was sent to all parts of the country, and suggestions and criticism invited. The responses thus called out have been carefully considered, and have, so far as approved, been embodied in a new bill. Among the most important points of this bill we note the following: The powers of Registers in Bankruptcy are considerably increased, and they are virtually made judges in the matters brought before them. They are to be paid salaries instead of fees and commissions. Assignees receive no commission or percentage, but only such compensation as the creditors shall agree to and the court approve. It is believed that by abolishing fees the chief objections to the former law will be removed, and no one will have any interest to secure in delaying settlements and encouraging tedious and costly litigation. It is intended that the costs of any case in bankruptcy or composition shall be so adjusted that they can be calculated in advance with a close approximation to accuracy. A clause is introduced into the bill which makes it a crime for creditors to knowingly permit fraud upon other creditors by proving false claims, or receiving money or other value as consideration for acting or refraining from acting in the selection of an assignee, the acceptance of a composition or the discharge of a bankrupt. Dividends which remain unclaimed for six years are paid over to the United States. We think they should be paid over to the bankrupt, his heirs or assigns, except in cases where there are no legal claimants. We have not yet had time to examine the bill so fully as to feel certain whether we can advocate its passage without amendment, but shall presently lay the full text before our readers.

A good general bankruptcy law is eminently desirable, but one which is not good, or which is so loosely drawn as to permit fraud and encourage dishonest failures, will be more objectionable than none at all.

The question whether the manufacturer

of tin cans and other vessels of tin plate is

entitled to a drawback of duties paid on the plates, provided he uses therewith certain domestic materials, such as solder, wire for bales, wood for hand-pieces, &c., has been referred to us, and as it is a question of some general interest, we cannot do better than to answer it in our columns. Under the act of March 10, 1880, amending section 3020 of the Revised Statutes, cans, &c., manufactured in part of imported materials, are entitled to the drawback provided for in section 3019, in all cases where the value of the imported material used in the manufacture is not less than 70 per centum of the value of all the materials so used. In other words, the manufacturer of tin cans and other vessels of tin plate for export, is entitled to a drawback on the tin he uses if the domestic materials combined with it are worth less than 30 per centum of the total value of the materials used in the articles manufactured. There is really no good reason why the law should not be further amended to permit the repayment of duties on re-exports, however much or little it may be. If a manufacturer for export uses of foreign materials which have paid duty only 10 or 5 per centum of the domestic materials used with them, he should have the duty thereon refunded. But we did not propose to discuss the equities of the case; we intended merely to state the facts. The present law, as we have said, allows the drawback on foreign materials exported as manufactures where the value represents not less than 70 per cent. of all the materials used.

In our report of the meeting of the American Society of Mechanical Engineers, in speaking of Mr. Lyne's paper on "Packing for Piston Rods and Valve Stems," we quoted him as referring to James Watt as the inventor of the modern stuffing box, with its cavities bevelled at top and to an angle of 60 degrees. Mr. Lyne sends the following extract from his paper, and calls our attention to the fact that he does not allude to James Watt as the inventor of the stuffing box, as we understood when making the report:

The piston engine was first invented in 1710 by Thomas Newcomen and John Cowley, of Dartmouth, in Devon. This engine was single acting, and passed through numerous stages of improvement until the year 1782, when James Watt invented and built a double-acting steam engine. Previously, however, Watt had made use of the stuffing box, which was the invention of Sir Samuel Morland, for packing piston rods. In a letter to Simeon, dated April, 1766, Watt explains the difficulties encountered in making a tight connection, allowing the piston rod to move freely. In the engine which was built in 1782, Watt, as a result of his previous experiments, bored a cavity in the cylinder head similar to those in use at the present time, the bottom of which was bevelled at an angle of about 60 degrees to a line parallel with the face of the cover.

Mr. Lyne has followed Dr. Lardner's statement, who, as he remarks in a private note, does not give any authorities nor dates. It appears from the examination of very ancient mechanical works, that most of the common mechanical devices are very old. Indeed some that are considered recent can be traced for at least 200 years. Strap ends, fly wheels, flanges for bolting parts together, cocks, clack and poppet valves, cranks and connecting rods, guides and a multitude of other things of a similar character were probably used long before the modern machinery epoch began.

Mr. Lyne also calls our attention to the fact that the paper on "Mechanical Correctness" was read by Mr. C. A. Hague instead of Mr. Hemenway, as we stated.

Sulphur in the Basic Process.

The following letter from Mr. Sidney G. Thomas, one of the patentees of the basic process, will be read with interest. It would have appeared sooner, but was mailed to Pittsburgh instead of New York by a mistake of the writer:

To the Editor of *The Iron Age*.—Sir: In a recent issue I observe you quote a single analysis, said to be by Prof. Kupelwieser, of a "basic" Bessemer blow which seems to show that sulphur may be actually increased during a dephosphorizing operation, from which you draw the deduction that sulphur may prove a *bête noir* of the process. I have not, so far, seen the original report of Prof. Kupelwieser from which you quote, but, assuming that the sulphur record in question is not merely due to a misprint, I can only conclude it must arise from an error in the sampling or analysis. My reasons for this opinion are these: Hundreds of analytical examinations of the course taken by sulphur in the dephosphorizing process have been made, not only by those connected with the process, but by a host of eminent chemists and metallurgists of all nations, desirous of making independent examination of the chemical features of the operation. In no case, however, has it happened to my knowledge that so anomalous and contradictory a result as such an increase of sulphur percentage has been even suggested. That so great an increase as is indicated could take place is, indeed, almost incredible. Whence could it arise? It is well known that an apparent small increase is shown in the ordinary Bessemer process, but this is due, of course, merely to the waste of iron. That an increase to the extent of 100 per cent. should occur is almost impossible. I may add that the mean result of many scores of analyses shows that from 60 to 70 per cent. of the sulphur present in the pig is removed in the lime dephosphorizing process. If sulphur is ever not removed, it must be under very exceptional circumstances that I have so far not encountered, or when mere traces of sulphur are present in the pig treated. That it could be ever increased in dephosphorizing is utterly contrary to all probabilities and experience. Finally, as

sulphur is readily removed in the blast furnace by well-known means, there is no apprehension of its causing trouble to steel makers in the subsequent operations.

Yours truly, ST. G. THOMAS.
Palace Chambers, Westminster Bridge, London, September 29, 1880.

Our Foreign Metal Trade During Eight Months.

The Bureau of Statistics at Washington has just published particulars of the foreign trade movement in the United States during the first eight months of the current calendar year, as compared with the corresponding period in 1879. We have extracted therefrom all items relating to the import and domestic export of metals and metal goods, leaving out the re-export as of little importance, and reducing values to thousands of dollars:

| Articles | Weights and Numbers. | | Values. | |
|----------------------------|----------------------|------------|--------------|--------------|
| | 1879. | 1879. | 1879. | 1879. |
| Tin, cwt. | 201,134 | 141,704 | \$4,645 | \$1,817 |
| Brass manuf. | ..... | ..... | 283 | 174 |
| Copper ore, cwt. | 2,297,782 | 132 | ..... | ..... |
| Copper ingots, lbs. | 2,297,750 | 74,949 | 1,760 | 1,183 |
| Pig iron, lbs. | 1,348,124,073 | 16,009,114 | 12,851 | 1,462 |
| Castings, lbs. | 140,647 | 71,532 | 1,074 | 2 |
| Bolts from lbs. | 219,950,520 | 27,440,041 | 4,075 | 554 |
| Hoops, &c., lbs. | 48,554,778 | 100,854 | 990 | 2 |
| Rails, lbs. | 231,034,491 | 3,261,863 | 540 | 216 |
| Sheet iron, lbs. | 16,019,993 | 15,774 | 2,423 | 388 |
| Spelter, tons. | 32,999 | 74,809 | 116 | 57 |
| Hardware | 2,299,377 | 745,809 | 1,076 | 380 |
| Anchors, &c., lbs. | ..... | ..... | 507 | 973 |
| Machinery | ..... | ..... | 1,231 | 1,024 |
| Plates, &c. | ..... | ..... | 114 | 68 |
| Steel ingots | 187,504,098 | 23,409,646 | 3,100 | 268 |
| Rails, lbs. | ..... | ..... | 1,260 | 865 |
| Cutterly | ..... | ..... | 1,000 | 1,000 |
| Shears and tools | ..... | ..... | 114 | 68 |
| Other manuf. | ..... | ..... | 4,612 | 1,146 |
| Lead, lbs. | 6,441,228 | 1,417,519 | 233 | 44 |
| Lead manuf. | ..... | ..... | 1,016 | 1,016 |
| Bar, iron, lbs. | 451,077 | 710,781 | 18 | 20 |
| Barrel plate, lbs. | 1,000,394 | 3,381,087 | 180 | 60 |
| Hoops, &c., lbs. | 193,503 | 243,921 | 11 | 10 |
| Castings | ..... | ..... | 154 | 94 |
| Wheels | 5,250 | 5,030 | 71 | 59 |
| Stoves | ..... | ..... | 1,000 | 1,000 |
| Locomotives | 37 | 64 | 270 | 5,5 |
| Steam engines | 75 | 83 | 317 | 70 |
| Boilers | ..... | ..... | 51 | 68 |
| Nails and spikes, lbs. | ..... | ..... | 2,307 | 2,664 |
| Other mfrs. of | 4,574,067 | 5,760,296 | 301 | 169 |
| Other mfrs. of | ..... | ..... | 3,806 | 3,474 |
| Steel ingots | 159,672 | 38,421 | 22 | 5 |
| Cutterly | ..... | ..... | 47 | 64 |
| Edging tools | ..... | ..... | 642 | 563 |
| Files and saws | ..... | ..... | 1,000 | 1,000 |
| Fire arms | ..... | ..... | 841 | 1,845 |
| Steel rails, lbs. | 25,565 | 2,757,220 | 2 | 49 |
| Other steel goods | ..... | ..... | 243 | 229 |
| Lamps | ..... | ..... | 178 | 219 |
| Cannons | ..... | ..... | 3 | 1 |
| Cartridges | ..... | ..... | 399 | 299 |
| Shot and shell | ..... | ..... | 1 | 1 |
| Antimony's ore, cwt. | 3,286 | 7,625 | 52 | 149 |
| Plated ware | ..... | ..... | 161 | 203 |
| Printing presses and tools | ..... | ..... | 202 | 1,28 |
| Quicksilver, lbs. | 1,000,892 | 3,404,000 | 1,217 | 1,217 |
| Scales | ..... | ..... | 185 | 145 |
| Sewing machines | ..... | ..... | 1,020 | 1,072 |
| Fire engines | ..... | ..... | 4 | 4 |
| Watches | ..... | ..... | 157 | 77 |
| Zinc ore, cwt. | 4,339 | 6,284 | 52 | 70 |
| Sheet zinc, lbs. | 1,479,447 | 416,530 | 141 | 32 |
| Other goods | ..... | ..... | 589,147 | 429,006 |
| | | | \$14,176,060 | \$14,176,060 |

From these tables it appears that during the period named the import has been \$70,345,000 this year, against \$17,904,000 last year, or about four times what it was then, and the domestic export \$12,822,000, against \$15,684,000, a falling off of 19 per cent. There has been an increase of note in the importation of tin, copper, pig iron, merchant ditto, rails, scrap iron, steel, tin plates, lead and spelter, and a notable decrease in the exportation of copper and quicksilver, other items showing little change.

Treasury Rulings on Steel Duties.

(From Our Own Correspondent.)

WASHINGTON, D. C., November 18, 1880.

Daniel J. Morrell, of Pennsylvania, who has been in Washington for several days, had a conference with the Secretary of the Treasury respecting the duties on steel-wire rods in coils. He frankly informed the Secretary that he did not think that the "Schedule E, Metals," was in many respects, construed in the interests of American manufacturers, and that the mills manufacturing this article of steel were closed because they could not compete with the foreign makers. Mr. Morrell, therefore, asked a construction of the law more favorable to this branch of industry, and specifically an increase of duty, in the words of the statute, from "Steel in ingots, bars, coils, sheets and steel wire, not less than one-fourth of 1 inch in diameter, valued at 7 cents per pound or less, 2 cents and one-fourth per pound; valued at above 7 cents, and not above 11 cents per pound, 3 cents per pound; valued at above 11 cents per pound, 3½ cents per pound, and 10 per centum ad valorem." At the department it is claimed that at the rate of 2½ cents per pound the particular class of manufacturers of steel alluded to by Mr. Morrell—that is, steel-wire rods in coils—would reach 125 per cent. ad valorem.

A question having arisen respecting the assessment of duties at the rate of 45 per cent. ad valorem on two steel shafts manufactured by Krupp in Germany, the acting Secretary of the Treasury, as there is no specific provision in the tariff for shafts, and as the shafts in the present case are

obviously covered by the provision for manufactured steel, has affirmed the decision of the collector of customs at New York, and he is ordered to take measures for the collection of the additional duties. It appears that the articles in question are described on the invoice and entry as axles; that the appraiser returned them as steel shafts for steamers, manufacturers of steel, and that the importers claimed that they should be classified under the provision of the tariff "for axles or parts thereof," and treated as dutiable at the rate of 2½ cents per pound only.

In his decision Judge French says: "The articles may be described as crank screw or propeller shafts, by means of which motion is given to the propeller; that after due consideration of the reports which have been obtained from various experts and officers of the department, and of the definitions given by lexicographers and other authorities to the terms 'axle' and 'shaft,' respectively, the department is satisfied that there is a recognized distinction, commercial and otherwise, between the two designations, and that, in view of the decisions of the courts requiring the classification of articles for the assessment of duties according to the commercial understanding of the term used (2 Abbott's Dig., 188), and to its common, every-day meaning (U. S. vs. Clayton), shafts like these, which are to be used to transmit power to a propelling wheel, cannot properly be classified under the provision of law above quoted for axles."

The Secretary of the Treasury on the appeal from the assessment of duty at the rate of 1¼ cents per pound on certain car truck channels reports further:

The appraiser reports that the merchandise consists of pieces of rolled or hammered iron, about 7 feet long by 10½ inches wide, with flanges on each side and holes punched so as to fit them for immediate use.

From this description of the articles, which appear to be completely manufactured and intended for a specific purpose, the department is of opinion that they are entitled to entry at the rate of 35 per cent. ad valorem—manufactures of iron."

You are therefore authorized to adjust the entry accordingly, and to forward a certified statement for a refund of the excess of duties.

Strength in Machine Tools.

Mr. Charles T. Porter, in his paper before the American Society of Mechanical Engineers at its last meeting, offered the following valuable suggestions:

As one subject of primary importance, I wish to present that of strength in machine tools. Truth of construction, facility of operation, and range of application are all, in one sense, subordinate to this fundamental quality of strength; for they are in a greater or less degree impaired where adequate strength is not provided.

But what is adequate strength? On this point there exists among the makers and users of tools a wide diversity of opinion. And on examination it will be found that this diversity coincides with the diversity in mechanical sensibility. As the mechanical sense is developed, there arises in just the same degree the demand for greater strength in machine tools.

To the mechanic who has never formed a notion of division of an inch more exact than "a bare 32nd," one tool, if it can in any way be kept from chattering, is as good as another, and better if it is cheaper.

To those, on the other hand, who demand in every piece, as it comes from the tool, the closest approach to perfection, both in form and finish, a degree of strength in the tool appears, and is demonstrated, to be indispensable, that to the former class seems as absurd as the results attained by means of it appear incredible.

In this country, as indeed all over the world, the standard of mechanical truth has been very low. It is here, however, as everywhere, rapidly rising. The multitude are being educated up to the standard of the few. In this work members of this Association have borne and now bear an honorable part. Just in the degree that the standard of mechanical excellence is raised must the demand become more general for greater strength in machine tools, as indispensable to its attainment.

But what is the standard of strength? The anvil affords perhaps its best illustration. It is a strength enormously beyond that which prevents a tendency to chatter, a strength that under even the heaviest labor prevents the least vibration of any part of the tool, or any indication of effort, more than if the object being cut were a mass of butter.

It will be seen that this absolute solidity in machine tools, while truth cannot be attained without it, enables also mechanical operations generally to be performed with far greater expedition, and the subsequent work of the finisher to be in any case much diminished, and often dispensed with entirely.

We are enabled, in most cases, to come at once to the form desired, whatever may be the quality of material to be removed, and always to finish the surface with a degree of truth and polish otherwise unattainable, dispensing, in a great measure, with the use of that abomination, the file.

Now with this standard in our mind, we look over the face of the land, and behold it covered with rubbish.

It is curious to observe how ingenious tool makers have generally been in trying to avoid this quality of strength, and how deceptive an appearance in this respect many tools present.

It is interesting also to note how little this quality of solidity adds to the cost of casting. The addition is merely so much more pig iron, and really not that, because in the stove-plate style the forms are more complicated, the patterns more expensive and frail, and the cost of molding is greater. But what signifies even a considerable increase in the first cost of a tool that in daily use is to perform the work of many, and is to place its possessor on mechanical eminence?

It is not the purpose of this paper to enter into details, interesting and important as they are, but to draw attention to the subject in a general way. The improvement observed quite recently in this respect, as well as in

other points of tool construction, is highly gratifying, and encourages the expectation of still further and more general progress.

Trade Report.

Office of THE IRON AGE.

Wednesday Evening, November 17, 1880.

The past week has been one of moderate activity in financial circles. The money market shows a tendency to greater firmness, and the ruling rate on call loans has been 4% at 5%, and in some cases 6% and 1-32 per day. In some other exceptional cases it has been loaned as low as 2%.

The importations of specie and bullion at this port during the past week were \$2,107,197, consisting of \$1,337,872 gold and \$729,325 silver, as against a total of \$3,248,952 for the corresponding week of last year. The importations since the 1st of January and since the 1st of August compare as follows with the movements during the corresponding periods last year:

| | | |
|-----------------|--------------|--------------|
| Since January 1 | 1880. | 1879. |
| Gold | \$47,630,258 | \$60,041,617 |
| Silver | 4,971,464 | 7,217,560 |
| Total | \$52,601,722 | \$67,259,177 |
| Since August 1 | 1880. | 1879. |
| Gold | \$45,655,891 | \$59,200,892 |
| Silver | 1,746,958 | 1,878,007 |
| Total | \$47,432,849 | \$61,087,899 |

Government bonds have been strong, and the 4s and 4½s advanced to the highest quotations yet reached for these issues. They improved ½@ 1%. Other first-class investment securities were also strong. Below we give the closing quotations of governments.

The stock market was alternately strong and weak for speculative shares, with frequent and wide fluctuations. The principal dealings have been in Erie, Reading, New Jersey Central, Delaware, Lackawanna and Western, Kansas and Texas, Wabash and Western Union. Below we give the closing quotations of shares in the active list.

The National bank averages compare as follows for the past two weeks:

| Nov. 6. | Nov. 13. | Comparison. |
|-----------------------|---------------|---------------------------|
| Loans..... | \$224,370,000 | \$231,700,000 |
| Specie..... | 11,080,600 | 12,474,000 |
| Legal tend. | 11,080,600 | 12,474,000 |
| Tot. reserve.... | 75,681,700 | 77,430,300 Dec. 1,251,000 |
| Deposits..... | 307,796,000 | 307,708,200 Dec. 68,500 |
| Reserve required..... | 76,949,175 | 76,972,650 Dec. 22,125 |
| Surplus..... | 1,732,125 | 503,320 Dec. 1,223,750 |
| Circulation..... | 18,691,700 | 18,708,700 Inc. 16,900 |

The foreign trade movements for the week are shown in the following tables:

IMPORTS.

For the week ended November 13:

| | | |
|---------------------|-------------|-------------|
| 1878. | 1879. | 1880. |
| Total for week..... | \$5,170,365 | \$6,497,541 |
| Prev. reported..... | 243,770,545 | 274,797,757 |

Since Jan. 1....\$48,867,385 \$23,294,398 \$42,631,297

Included in the imports of general merchandise for the week were articles valued as follows:

| Quantity. | Value. |
|-------------------------|---------------------|
| Anvils..... | 202 \$2,292 |
| Brass goods..... | 20 2,729 |
| Bronzes..... | 30 6,655 |
| Chains and anchors..... | 20 1,240 |
| Copper..... | .. 375 |
| Clothing..... | 123 3,710 |
| Fine... .. | 1 344 |
| Guns..... | 44 11,010 |
| Hardware..... | 23 375 |
| Iron hoop, tons..... | 257 11,201 |
| Iron, pig, tons..... | 1,251 40,688 |
| Iron, sheet, tons..... | 145 22,185 |
| Iron ore, tons..... | 6,347 31,804 |
| Lead, pigs..... | 2,046 61,197 |
| Metal goods..... | 244 13,693 |
| Nails..... | 47 535 |
| Needles..... | 17 2,688 |
| Old metal..... | .. 3,353 |
| Platina..... | 1 675 |
| Plated ware..... | 1 494 |
| Perfume caps..... | 41 4,949 |
| Steel..... | 2 40 |
| Silverware..... | 7,810 50,510 |
| Tin, boxes..... | 26,702 134,654 |
| Tin, cans..... | 247,670 lbs. 62,610 |
| Wire..... | 23 4,670 |
| Zinc..... | 27,274 17,512 |

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended November 16:

| | | |
|---------------------|-------------|-------------|
| 1878. | 1879. | 1880. |
| For the week..... | \$6,301,896 | \$6,810,600 |
| Prev. reported..... | 243,625,474 | 293,228,857 |

Since Jan. 1....\$301,017,370 \$202,488,457 \$360,376,373

EXPORTS OF SPECIE.

For the week ended November 13:

| | |
|--------------------------|-----------|
| Total for the week..... | \$314,246 |
| Previously reported..... | 6,728,784 |

Total since January 1, 1880.....\$7,972,030

Same time in 1879.....13,339,200

Same time in 1878.....12,462,360

Same time in 1877.....24,107,383

Same time in 1876.....48,063,685

Same time in 1875.....68,391,842

Same time in 1874.....45,794,824

Same time in 1873.....45,623,668

Same time in 1872.....45,623,668

The closing quotations for United States bonds were as follows:

| Bid. | Asked. |
|--------------------------------|---------|
| U.S. 6's 1880 registered..... | ton 5/4 |
| U.S. 6's 1880 coupon..... | 102 5/4 |
| U.S. 6's 1881 registered..... | 104 5/4 |
| U.S. 6's 1881 coupon..... | 104 5/4 |
| U.S. 5's 1880 registered..... | 104 5/4 |
| U.S. 5's 1880 coupon..... | 104 5/4 |
| U.S. 4½'s 1880 registered..... | 112 5/4 |
| U.S. 4½'s 1880 coupon..... | 112 5/4 |
| U.S. 4's 1880 registered..... | 112 5/4 |
| U.S. 4's 1880 coupon..... | 112 5/4 |
| U.S. 3's 1880 registered..... | 112 5/4 |
| U.S. 3's 1880 coupon..... | 112 5/4 |
| U.S. 2's 1880 registered..... | 112 5/4 |
| U.S. 2's 1880 coupon..... | 112 5/4 |
| U.S. 1's 1880 registered..... | 112 5/4 |
| U.S. 1's 1880 coupon..... | 112 5/4 |
| U.S. Currency 6s 1885..... | 120 |
| U.S. Currency 6s 1886..... | 120 |
| U.S. Currency 6s 1887..... | 120 |
| U.S. Currency 6s 1888..... | 123 |
| U.S. Currency 6s 1889..... | 123 |
| U.S. Currency 6s 1890..... | 123 |

The following were the closing quotations of active shares:

| Bid. | Asked. |
|---|-----------|
| American District Telegraph..... | 75 7½ |
| Atlantic and Pacific Telegraph..... | 40 4½ |
| Alton and Terre Haute..... | 36 37 |
| Pref. | 108 |
| American Union Telegraph..... | 6 |
| Burlington and Quincy..... | 162 5/4 |
| Central Pacific..... | 84 5/4 |
| C. C. and I. C. | 20 3/4 |
| Chicago, St. Louis and New Orleans..... | 39 3/4 |
| Ohio Central..... | 25 5/4 |
| Chicago and Alton..... | 128 2/4 |
| Cheapeake and Ohio..... | 104 5/4 |
| Pref. | 26 2/4 |
| " " Prof. | 27 2/4 |
| Clev., Col., Cin. and Indianapolis..... | 80 80 5/4 |
| Climax..... | 36 5/4 |

The following were the closing quotations of active shares:

Bid. Asked.

Caribou.....

Canada Southern.....

Colorado Coal and Iron.....

Denver and Rio Grande.....

Delaware, Lack, and Western.....

Delaware and Hudson Canal.....

Excelsior Mining.....

Express—Adams.....

Wells, Fargo.....

" American.....

" United States.....

Erie.....

Homestake.....

Hannibal and St. Joseph.....

Pref.

Express—Adams.....

Wells, Fargo.....

" American.....

" United States.....

Mont. Gas.....

Morris and Essex.....

Michigan Central.....

Metropolitan Elevated.....

Marietta and Cincinnati Pref.

" ad. Pref.

Mobile and Ohio.....

Northern Pacific.....

Pref.

P

| | | |
|---------------------|-------|-------|
| Hdw., cs..... | 415 | 6,058 |
| Tim., gals..... | 1,360 | |
| Machinery, cs..... | 60 | 3,873 |
| Railroad cars..... | 10 | 3,800 |
| Nails, kegs..... | 131 | 480 |
| Tacks, cs..... | 40 | 265 |
| Nails, bxs..... | 5 | 37 |
| Clocks, cs..... | 98 | 2,302 |
| Hdw. ware, cs..... | 22 | 1,973 |
| Glasses, e, cs..... | 135 | 1,87 |
| Sew. ma., cs..... | 26 | 844 |
| Watches, case..... | 1 | 300 |
| Pg. mtl., pcks..... | 11 | 477 |
| Pumps, pkgs..... | 14 | 834 |
| Cgo. mt., pkgs..... | 7 | 600 |

Venezuela.

| | | |
|---------------------|-------|-------|
| Ptim., gals..... | 9,000 | 1,360 |
| Glassw'e, pcks..... | 11 | 154 |
| Lamps, pkgs..... | 5 | 240 |
| Carte, pkgs..... | 22 | 475 |
| Cante, cs..... | 10 | 30 |
| Dy. mtl., pcks..... | 3 | 30 |
| Hdw., pkgs..... | 20 | 908 |
| Mf. iron, pkgs..... | 15 | 171 |
| Iron safe..... | 1 | 120 |
| Nails, kegs..... | 53 | 171 |
| Ag. imp., pkgs..... | 1 | 27 |
| Nails, bxs..... | 7 | 80 |

Danish West Indies.

| | | |
|---------------------|--------|-------|
| Coal, tons..... | 675 | 2,700 |
| Fleenna. | | |
| Ptim., gals..... | 25,000 | 3,600 |
| Pumps..... | 20 | 20 |
| Clocks, cs..... | 10 | 30 |
| Hdw., cs..... | 20 | 908 |
| Mf. iron, pkgs..... | 15 | 171 |
| Iron safe..... | 1 | 120 |
| Nails, kegs..... | 53 | 171 |
| Ag. imp., pkgs..... | 1 | 27 |
| Nails, bxs..... | 7 | 80 |

Bristol.

| | | |
|----------------------|---------|--------|
| Ptim., gals..... | 265,500 | 33,000 |
| Cider presses..... | 2 | 150 |
| London. | | |
| Hdw., cs..... | 146 | 3,145 |
| Wagons..... | 2 | 700 |
| Cutlery, cs..... | 2 | 127 |
| Mf. iron, pkgs..... | 60 | 3,331 |
| Clocks, pkgs..... | 260 | 7,866 |
| Glassware, cs..... | 5 | 300 |
| Arms, cs..... | 49 | 3,000 |
| Hdw., cs..... | 4 | 2,751 |
| Ptldware, cs..... | 2 | 250 |
| Glasgow. | | |
| Sew. ma., cs..... | 110 | 1847 |
| Beltng, cs..... | 1 | 367 |
| Tele. matl., cs..... | 15 | 1,275 |
| Clocks..... | 7 | 360 |
| Hdw., cs..... | 21 | 386 |
| Mf. iron, pkgs..... | 7 | 2,000 |
| Iron rolls, cs..... | 2 | 357 |

Hayti.

| | | |
|-----------------------------------|-----|-------|
| Hose, cs..... | 2 | 850 |
| Copper, cks..... | 975 | |
| Tim., pcks..... | 18 | 300 |
| Mf. iron, pkgs..... | 57 | 300 |
| Cutlery, case..... | 1 | 109 |
| Pto driver..... | 1 | 109 |
| Hdw., cs..... | 65 | 1,658 |
| Glassw'e, cs..... | 24 | 315 |
| Ptldware, bxs..... | 2 | 104 |
| Iron, pkgs..... | 260 | 454 |
| Coal, bds..... | 15 | 78 |
| Wheels, pr... Nails, kegs..... | 18 | 300 |
| Nails, kegs..... | 45 | 45 |

Central America.

| | | |
|---------------------|----|-----|
| Ag. imp., pkgs..... | 12 | 149 |
|---------------------|----|-----|

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending November 15, 1880:

Hardware.

| | | |
|---|--|--|
| Alexander F. & Sons, Files, cask, 1 | | |
| Boker Hermann & Co. Cases, 25 Casks, 4 | | |
| Carey S. Millstones, cks, 25 | | |
| Curtis & D. Cutlery, cask, 1 | | |
| Folsom H. D. Cases, 4 | | |
| Field A. & Co. Casks, 2 Chains, cks, 5 | | |
| Horn & Bros. & Read, Per caps, cs, 4 | | |
| Harley & Graham, Arms, cs, 10 | | |
| Jungo J. W. Arms, case, 1 | | |
| Lippincott J. B. Cotton, 2 | | |
| Len & Brumman, Case, 1 Livingston W. & F. Millstones, cks, 10 | | |
| Millstones, cks, 10 Grindstones, 17 Merchant's Dis. Co. | | |
| Groves, c. 3 Moore J. P. Sons, Mds., 1 | | |
| Moseman C. M. & Bros. Cases, 2 | | |
| Moore H. Files, cks, 4 Seymour W. N. & Co. Cutlery, c. 3 | | |
| Scov. Mfg. Co. Mds., pckg., 1 | | |
| Schuyler & Graham, Guns, case, 1 Whyte Alex. Case, 1 | | |
| Wetzlar M. Mds., pckg., 1 Wiebust & Hilger Hdw., pckg., 15 Order, Arms, cs, 42 Whetstones, cs, 10 Cases, 9 Casks, 3 | | |
| Iron. | | |
| Bank of N. Y. Hoops, bds., 2,999 Baring Bros. Wire, bds., 170 Wire, plates, 100 Pig. tons, 100 Bank of San Francisco, Pig. tons, 345 Brown Bros. & Co. Ores, bds., 1,520 Gal. wire, cks, 19 Bloomfield J. C. & Son, Machinery, pcks., 16 Drexel, Morgan & Co. Ore, tons, 199 Henderon Bros. & Co. Pig. tons, 150 Irwin Richard & Co. Pig. tons, 500 | | |

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, Nov. 15, 1880.

Pig Iron.

The market shows very little change—demand fair, prices steady and firm. The chief interest at present is in finished Iron, which is lower in proportion than the crude article. There are no indications whatever of weakening in Pig Metal, and consumers appear satisfied with prices now current. The volume of business during the week has been large, but at somewhat irregular prices. Two or three large lots, amounting to nearly 8000 tons in all, were taken at prices below the general market, but considering all the circumstances these sales are considered very satisfactory. Brands of iron not much known, coming on the market in lots of 2000 tons each and upward, are not easily disposed of at any time, and the fact of their being placed so near the market rate, shows much confidence in values. During the past three or four weeks a great many of what may be called outside lots have been picked up, which has had the effect of relieving the pressure on the more prominent furnaces. In fact, it is quite probable that, without these and some sales of foreign stock, prices would have been pushed upward, as it is evident the large and increasing consumption cannot be met as formerly by a few leading companies. The tone of the market, therefore, is steady and firm, and at the same time without any tendency toward speculation. Sales reported during the week have been at about the following rates: No. 1 Foundry, in the ordinary way of business, \$25 @ \$26 for best brands, and in one case \$26.50 has been realized for a very desirable make, and \$27 is now asked for more. Comparatively

new brands have been sold below \$25, and in one instance a 2000-ton lot changed hands at less than \$24—rumor says at \$23. These are the extremes of the market, however, and in the one case represents a transaction to realize cash, and in the other small lots of a particular brand in the ordinary course of business. No. 2 Foundry is comparatively quiet, and sells at \$21.50 @ \$22.50, according to brand. Gray Forge Iron has been heavily sold, and prices are very steady. One lot of 2000 tons sold at \$10.50, and same figure bid for more. Others and better known brands sold at \$20 up to \$21, and stocks are considerably reduced.

White and Mottled Irons are quite scarce, the market having been pretty well cleared at \$17.50 @ \$18, and \$18.50 @ \$19. A 500-ton lot of English Iron was taken at about \$18.50, and Scotch Iron in small lots at \$22.50, and \$23 for Gartsherrie. Charcoal Iron is irregular, and varies from \$33 @ \$36 for Warm Blast, and \$35 @ \$40 for Cold Blast.

Blooms.—Are dull and prices very irregular. Some makes are held at the extreme quotations, and are said to sell at the full quotation, too, but in the majority of cases sellers are quite willing to accept the inside figure, and even less to a good buyer. Nominal rates are as before: Cold-Blast Charcoal Blooms, \$67.50 @ \$70 per ton of 2464 lbs.; Run-out Anthracite, \$57.50; Sunken Scrap Blooms, \$52.50 per ton of 2240 lbs.; and Northern Ore Blooms, \$48 @ \$50.

Muck Bars.—We have not heard of any transactions within the past three or four days, but \$38 @ \$38.50 at mill is the asking price, and it is not likely that good bars could be had on better terms than these.

Structural Iron.—The activity noted in our last report has been fully confirmed, and the mills are now supplied with a large amount of work. Contracts for the construction of nine large iron boats for the New York bay passenger trade, and four 2500-ton iron steamships, for the coasting trade, have been made public during the week, and is an important addition to work in the Delaware ship-building yards. Bridge building is also in a healthy condition, and the outlook is in all respects of a satisfactory character. Prices are steady, and there is little chance of orders being placed, unless at full quotations. For ordinary sized lots, Angles are firm at 2 1/2 @ 2 7/8, Beams at 3 1/2, Channels and Tees, 3 1/2.

Plate and Tank Iron.—The movement has been to some extent felt at the Plate Mills also, and the mills are well supplied with orders. Prices have not been helped very much, however, and the heaviest transactions have been at inside rates, one lot of 200 tons of Tank Iron having been taken at 2 1/2. Prospects for an active business are satisfactory, and prices ought to strengthen a little, but so far the trade have failed to realize it. The market may be quoted active at about the following rates, viz.: Tank and Common Plate, 2 7/8 @ 2 8 1/2; C. N. I., 3 1/2; C. H. No. 1, 3 1/2; C. H. No. 2, 4 1/2; Flange Iron, 4 1/2 @ 5 1/2; Fire Box, 5 1/2 @ 6 1/2.

Sheet Iron.—Stocks begin to accumulate in manufacturers' hands, and buyers would probably obtain liberal concessions by taking good-sized lots. Small lots are about same as last quoted, and not likely to change for the present. Some experienced men predict a very active movement as soon as winter sets in, but in the meantime business is dull at the following rates for small lots, viz.:

Common Sheet, No. 25 to 28..... 4 1/2
Common Sheet, No. 16 to 21..... 4 1/2
Best Retarded, 30 @ 32, 1/2 per cent above the above.

Best Bloom Sheets, 25 to 28..... 7 1/2

Best Bloom Sheets, No. 22 to 25..... 6 1/2

Best Bloom Sheets, No. 16 to 21..... 6 1/2

Common Red Plates, 3 1/2 to 16..... 3 1/2

Blue Annealed, 3 1/2 to 16..... 3 1/2

Best Bloom Galvanized, discount..... 30 1/2

Best Bloom, quality, discount..... 40 1/2

Steel.—There is nothing of importance in this branch of the Iron trade, and last week's report would fairly represent the market at this date. Business is moderately active, and prospects for a steady and heavy demand are all that can be desired, but prices are most unsatisfactory. It is difficult to account for this condition of affairs; 2.4¢ ought to be the very inside rate with present rate of cost, but it is well known that very little business has been done at that figure for some weeks past. If the demand were falling off, some shading in prices might be understood; but with the cost of production increasing and a demand sufficient to keep all the mills employed, the present unremunerative rates are inexplicable. Sales during the week have been of the usual character, no specially large lots having changed hands for some time past. One 400-ton order was taken at a very low price, but it is said that the Bars are to be made from Old Rails. Refined Iron is quoted at 2.4¢.

Steel Rails.—Some heavy contracts have been closed during the week, sales during the past 10 days aggregating upward of 50,000 tons, about half the amount being from the Northern Pacific Railway. Prices cannot be given definitely, but it is safe to say that \$57.50 @ \$60, at mill, according to time of delivery, covers the greater portion of the transaction. A sale of 5000 tons is also reported at \$61, delivered at a port on Lake Erie, and other sales of lots of a few hundred up to 1000 tons each, for early delivery, at still higher prices. There seems to be more disposition to enter orders than there has been, nearly all the mills having increased their capacity, or are about increasing it at an early date. There is, therefore, a disposition to keep all the business at home that is possible. Consumption is likely to be very large during the coming year, but the home production will probably be equal to the demand.

Iron Rails.—The past week has been rather quiet, and the only

NEW ORLEANS.

Messrs. MINNIGERODE & Co., dealers in Railway Supplies, 61 St. Charles street, write as follows under date of November 12: The past week has shown great activity in our market, with prices on all grades of Iron very firm and an advancing tendency. In our judgment all raw material has advanced from \$1 to \$2 per ton. This is especially noticeable in Old Rails and Wrought Scrap, which may now be quoted at from \$2 to \$3 per ton higher than 10 days ago. The inquiry from Western points is much greater. We note sales of several parcels of new Iron Rails at prices ranging at about \$45.50 for English, delivered at seaboard, and \$46, at mill, for American.

ST. LOUIS.

Messrs. CARD & HOFFER, Pig Iron and Iron Ore Merchants, 417 Pine street, write us as follows, under date of November 13: Trade has been good during this week, but prices stand about the same. For cash, f. o. b. here, we quote:

HOT BLAST CHARCOAL.

| | |
|-------------------|-----------------|
| Missouri..... | \$26.00 @ 27.00 |
| Southern..... | 25.00 @ 26.00 |
| Hanging Rock..... | 26.00 @ 30.00 |

COKE AND COAL.

| | |
|---------------|---------------|
| Missouri..... | 25.00 @ 26.00 |
| Southern..... | 25.00 @ 26.00 |
| Ohio..... | 26.00 @ 27.00 |

MILL IRONS.

| | |
|-----------------|---------------|
| Cold-short..... | 28.50 @ 23.50 |
| Red-short..... | 23.00 @ 25.00 |

CAR WHEEL AND MALLEABLE IRONS.

| | |
|---------------|---------------|
| Missouri..... | 30.00 @ 35.00 |
| Southern..... | 35.00 @ 40.00 |
| Ohio..... | 38.00 @ 45.00 |

ORE.

| | |
|----------------------|---------------|
| Ore for fix..... | 10.00 @ 12.00 |
| For furnace..... | 6.50 @ 7.50 |
| Brown Hematites..... | no market. |

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of November 15: All our Iron works are very busy. Quotations firm, and, in some particulars, advanced:

| | |
|---------------------------------------|-----------------|
| Scotch Pig Iron..... | \$21.00 @ 28.00 |
| American Scotch Pig Iron..... | \$16.00 @ 20.00 |
| No. 1..... | 27.00 @ 29.00 |
| No. 2..... | 21.00 @ 24.00 |
| Mottled and White..... | 19.00 @ 20.00 |
| Virginia Charcoal Wheel Iron..... | 35.00 @ 40.00 |
| Old Rail..... | 26.00 @ 28.00 |
| Wrought Scrap No. 1..... | 23.00 @ 24.00 |
| Cast Machinery Scrap..... | 22.00 @ 23.00 |
| Richmond Refined Bar Iron..... | 26.00 @ 27.00 |
| Horse Shoes, Tredegar..... | 26.00 @ 27.00 |
| Mule..... | 5.00 @ 6.00 |
| Old Dominion Nails..... | 3.00 @ 3.50 |
| For lots of 200 kgs, 10¢ per kg less. | |

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of November 15: Prices rule rather more firm than for some weeks past, and there is a noticeable increase in the volume of trade attending the same. Otherwise matters remain as last reported:

| | |
|---|-----------------|
| Ref. Bar Iron, 1 to 6 by 3 to 1..... | 20 2/4 @ 25 1/2 |
| " " 1 to 4 by 1 1/2 to 2..... | 20 2/4 @ 25 1/2 |
| " " 3 to 2, Round..... | 20 2/4 @ 25 1/2 |
| and Square..... | 20 2/4 @ 25 1/2 |
| Horseshoe Iron, 1 1/2 wide and upward..... | 20 2/4 @ 25 1/2 |
| Band Iron, from 1 1/2 to 4 in. wide..... | 20 2/4 @ 25 1/2 |
| Horse-shoe Iron..... | 20 2/4 @ 25 1/2 |
| Norway Nail Rods..... | 20 2/4 @ 25 1/2 |
| Black Diamond Cast Steel..... | 12 1/2 @ 14 1/2 |
| Machinery Steel..... | 9 @ 10 1/2 |
| Cast Spring Steel..... | 8 @ 9 1/2 |
| Common Horse Nails..... | 10 @ 14 1/2 |
| Perkins' Horse Shoes, 2¢ per kg of 100 lbs..... | 4.37 1/2 |
| Mule shoes..... | 5.37 1/2 |

Putnam Horse Nails.....

Globe Horse Nails.....

Railroad Spikes.....

Less 10% discount to the trade.

R. C. HOFFMAN & Co., Iron and Commission Merchants, report the Pig Iron market as follows, under date of November 15: We have no change in prices of Iron since last report. The demand is about equal to supply, and prices firm at about following rates, viz.:

| | |
|------------------------------------|-------------------|
| Baltimore Charcoal Wheel Iron..... | \$38.00 @ \$40.00 |
| Virginia C. B. | 38.00 @ 40.00 |
| Anthracite No. 1..... | 28.00 @ 30.00 |
| " No. 2..... | 28.00 @ 24.00 |
| " Mottled and White..... | 18.00 @ 20.00 |
| Charcoal C. B. Blooms..... | 63.00 @ 65.00 |
| Refined Blooms..... | 63.00 @ 65.00 |
| | 53.00 |

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., November 1, 1880.

THE IRON MARKET

of this country, as a whole, may be said to have undergone a slight change for the better within the week. The improvement has not been great in any particular, but it is welcome to everybody, if for the sole and simple reason that it comes in place of the "further relapse," which has latterly been a chronic phrase in almost all our reports on trade matters. Taking the situation as it stands, I find it somewhat difficult to explain the precise nature of the slight amendment in question. Generally speaking, I suppose we may say that Glasgow has again led the way, and that the rather better prices obtaining there in respect of makers' brands of pig iron, have imparted renewed confidence to smelters and other classes of venders in the chief iron producing districts of England and Wales. I should also be disposed to attribute a good proportion of the better state of feeling to the remarkable activity which at the present time pervades the Scotch and North of England ship-building trades. It is stated on good authority that the tonnage now in hand in the Clyde, Tyne and Tees yards is much in excess of that for a very long time past—probably greater than at any previous epoch of the trade. All the principal yards are in a state of unexampled activity, and not a few of them have contracts on their books sufficient to insure steady employment for the greater portion of 1881. On the Humber and Mersey, and at Barrow, too, the shipyards are busy. The Cunard Company alone have

over 30,000 tons in course of construction, and 14 large vessels, aggregating nearly 40,000 tons, are in hand for French buyers who are desirous of benefiting by the new bounty laws of their country. As I had occasion to remark in my last week's letter, this flourishing condition of one of the greatest of our industries cannot fail to react in the most favorable manner upon the iron trade—iron being the material which enters most largely into the construction of all modern sea-going vessels. Already this effect is visible. There is not a single idle plate mill in the country; indeed, there is not one such mill in the North whereat deliveries on new orders can be promised in 1880, or even prior to February, 1881. With such a "backbone" as this, the iron trade ought to prosper, and that without any great delay. The pig-iron branch is undoubtedly doing well, shipments from Middlesbrough having, for some weeks past, been greatly in excess of those for last year, or for any given similar period. This is highly satisfactory so far as it goes, but it does not follow that the activity will prove enduring. With the closing of the Baltic and other northern navigations the exports in those directions must fall off, and it will require a wide development as regards France, Belgium, Germany, &c., to make up the balance. This season, too, we are having an unusually early inauguration of inclement weather. A fortnight ago we had a slight fall of snow, even in London, and last week many parts of the North and Midlands had a further and heavier downfall. Accounts from Cronstadt, Riga, &c., speak of formidable formations of ice already, so that we may regard the Northern seas as closed for four or five months ahead—perhaps even longer. The Cleveland smelters, however, do not seem inclined to anticipate the possible evil day, and are quite in unison in firmly upholding their selling rates. In their stores they witness a slight increase currently, but the quantity (110,000 tons) is not yet so large as to imperil the progress of the industry, nor to overshadow prices. It had been somewhat confidently anticipated by those interested that the announcement of the success of Bolckow, Vaughan & Co. in producing Bessemer steel direct from common Cleveland pig, would have had the effect of bringing down hematites. So far, however, nothing of the kind has happened—indeed, last week's transactions in these high class crude irons were on a basis quite as firm, to put it mildly, as that of the past month or so. The fact is the hematite smelters have long expected the blow which has at length fallen, and like wise men have gradually paved the way for its acceptance without even the semblance of panic or fear. They have not, perhaps, reaped the full harvest latterly open to them, but have exercised praiseworthy discretion in keeping down quotations within moderate limits. Further than this, they are well sold forward to the steel firms, and, besides, have many assurances which lead them to hope for a long lease of profitable employment. Time will, in all probability, test and depreciate the value of these favorable views, yet it cannot be denied that for some time yet to come the West Coast producers will not seriously feel the new "specter." Up to the present time only one large concern is likely, or able, to use common pig on a commercial scale. To convert the other plants so as to make them available for dephtosphorization will necessitate a heavy outlay, and it is not every concern which will or can spend the money. Old contracts have to be worked off and a variety of circumstances considered before the reform will take firm root. This means a delay which will operate in favor of the hematite houses. Leaving their interests for the time being, and looking for a moment at the possibilities arising out of dephtosphorization, it is palpable that very serious points are involved. Much of the best evidence lately tendered on the subject goes to show that not steel, but iron, may be the chief product of basic operations. M. Frousel, Mr. Pink, Mr. Hampton and Mr. Windsor Richards are all united in prophesying the early abolition of puddling in this manner. If this be found to be correct in practice, it is quite clear that the whole iron trade, not merely of Great Britain, but of the entire world, is on the eve of a revolution, as compared with which the initial Bessemer process was as mere feasible. I don't say that this is the case, but the "deponents" are of such standing in the metallurgical world that we cannot wholly disregard their testimony. At all events, if I were about to start an ironworks to-morrow I would spend no money on puddling or balling furnaces, but would erect converters in their stead. The matter rests at present, but its settlement is by no means final; on the contrary, we may expect marked developments in collateral directions before long. We move somewhat rapidly nowadays, and in spite of the terrible odds to be encountered in the shape of "vested interests," the march of progress will continue unchecked. In the meantime—resuming the lower flight—it is gratifying to note a marked increase in certain branches of the home trade. The harvest may have been uneven, but its results over a large area of England, Ireland and Scotland have been most satisfactory. The farmers are consequently in better spirits, and have more money in their pockets. The latter they are distributing among the rural traders, who, in turn, pass on a good percentage to the manufacturers. As an instance of this I may mention that a traveler for a firm making rainwater pipes, builders' castings, boilers, pumps, &c., who has just returned from his eastern counties' journey, informs me that in two weeks he has taken more orders than in any four or five journeys previously over the same ground, which he has covered for many years. Judging from evidence similar in purport to this, I infer that there is a very respectable amount of business doing throughout the country, and that we shall get over the remainder of the year without any lapse of moment. More than this I would not like to say at this present writing.

SCOTCH PIG IRON

has been somewhat better on the week, and now steady at undertenoted figures. There are 118 furnaces at work, of which 8 are running on hematite iron. This date last year 95 furnaces were in operation. Stocks

in Connal's stores have increased by 1653 tons, making the total 476,440 tons, against 356,056 tons same date 1879. Shipments are much smaller than in the comparative period, but imports of Cleveland pig have grown larger lately. Ballast pig is 45 alongside ship. I take the following from John E. Swan & Bros., Glasgow, prices current:

LANARKSHIRE BRANDS, FREE ALONGSIDE SHIP AT GLASGOW.

| Brands. | No. 1. | No. 2. | No. 4. | Prices. |
|---------------------------|--------|--------|--------|---------|
| Gartsherrie. | 61/6 | 53/6 | ... | |
| Coltness. | 62/6 | 53/6 | ... | |
| Langloan. | 63/6 | 53/6 | ... | |
| Shotts Bessemer, Ordinary | 62/9 | 53/9 | ... | |
| Calder. | 60/ | 51/ | ... | |
| Summerlee. | 58/ | 50/6 | 53/6 | |
| Chapelhall. | 56/ | ... | ... | |
| Collytree. | 56/ | 53/ | 55/ | |
| Clyde. | 52/ | 50/6 | 52/ | |
| Quarter-Clyde. | 52/6 | 50/6 | 52/ | |
| Govan. | 52/6 | 50/6 | 52/ | |
| Wishaw. | 52/6 | 50/6 | 52/ | |
| Monkland. | 52/6 | 50/6 | 52/ | |

AYRSHIRE BRANDS, FREE ALONGSIDE SHIP AT ARDROSSAN.

| Brands. | No. 1. | No. 2. | No. 4. | Prices. |
|--------------|--------|--------|--------|---------|
| Glengarnock. | 55/ | 52/6 | 55/ | |
| Ardeer. | 55/ | 52/6 | 55/ | |
| Eglinton. | 55/ | 52/6 | 55/ | |
| Lugar. | 55/ | 52/6 | 55/ | |
| Muirkirk. | 55/ | 52/6 | 55/ | |
| Portland. | 55/ | 52/6 | 55/ | |

Dalmellington..... 52/6 50/6 52/

EAST COAST BRANDS, FREE ALONGSIDE SHIP IN THE FORTH.

| Brands. | No. 1. | No. 2. | No. 4. | Prices. |
|-----------------------|--------|--------|--------|---------|
| Carron, Selected..... | 55/ | 52/6 | 70/ | |
| Carron, Ordinary..... | 52/6 | 50/ | ... | |
| Almond, Export..... | 55/ | 52/6 | ... | |
| Almond, Home use..... | 54/6 | 50/6 | ... | |
| Kincraig..... | 54/6 | 50/6 | ... | |

CLEVELAND PIG IRON

is firm at undemanded prices. In Carron's Middlesbrough stores there are about 110,000 tons, and stocks are slightly accumulating. The local demand for pig is excellent—50 per cent. above last year to this date. From Middlesbrough alone this month's shipments reach about 80,000 tons of pig. Current rates for G. M. B. usual terms and ports, and are, for net cash:

| No. 1. | No. 2. | No. 3. | No. 4. | Prices. |
|--------------|--------|--------|--------|---------|
| Creator..... | 72/6 | 71/ | 70/ | |

both consumption and export are fully on a par with the capacity of product. P. S.—The North-western Railroad has bought Steel Rails in Germany at 144 marks, delivered at Tetschen, which is very low. Iron prices are upheld with difficulty here at 10 @ 60 florins per 100 kilos, for Pig, and 105 @ 125 for Merchant Iron. Metals, on the other hand, have been well sustained, especially Copper and Tin. We quote Copper, 65 @ 79; Tin, 110 @ 115; Lead, 21 @ 22; Spelter, 50 @ 53; Antimony, 80 @ 85; Sheet Zinc, 28.50; Nickel, 4.50 per kilo; and Zinc White, 34.50 @ 45 florins per 100 kilos.

CHILI.

(Weber & Co.)

VALLPARAISO, Sept. 11, 1880.—Copper.—Notwithstanding the lower quotations from Europe prices have been firmly sustained, leaving to producers may ship their Nitrate on paying the duty. Meanwhile there has been lack of animation, since private producers have scarcely had any Nitrate to sell, and the government has made no further charter. Sales have been restricted to 102,000 quintals, or 65 @ 75. Taltal. Export in August has been, from Iquique, 401,752 quintals; from Antofagasta, 18,274, and from Taltal, 93,554; together, 655,530 quintals, of which 56,564 to the United States. There were loading at latest dates 223,700 quintals at Iquique, 42,000 at Antofagasta, 70,200 at Tocopilla and 115,000 at Taltal; together, 450,900. The shipments have been, from January 1 to August 31,

1880. 1879. 1878.
Quintals. Quintals. Quintals.
To the North of Europe..... 5,115,38 5,101,662 5,516,06
To the United States. 472,294 193,722 579,579
To the Mediterranean..... 22,033 97,701

Total 5,601,652 5,295,184 4,193,542
Exchange has been in moderate request at steady rates, improving to 56½ to-day for 90 days' drafts.

AUSTRALIA.

(Mining News)

BRISBANE, Queensland, Sept. 3, 1880.—Tin.—There has been within the past fortnight an extension of the tin fields in this Colony, situated about 20 miles from the coast, and extending North of Brisbane, about 70 miles Southwest of Gladstone, and 20 miles Northwest of Bundaberg, all ports on the Eastern Coast of this Colony. The nearest water carriage is up Baffle Creek, which is a small tidal river and has 6 feet water to within four miles of the prospector's lease. The Stream Tin is found on the banks of this Baffle Creek and it is worked by hand, being sold at 12½ cwt. to 1 cwt. Stream Tin to the ton of wash dirt. This is the fourth large Tin field now discovered in this Colony. The first and oldest, Stanthorpe, is turning out about one-third more at present than it did last year, owing to the high prices now ruling. The second, Cooktown field, is working well, Chinese being chiefly employed in raising and washing the Stream Tin. All this Tin is shipped from Cooktown to London, and has been doing so for the past 18 months, and now yields about 20 tons per month. The third, Cairns, to the South of Cooktown 40 or 50 miles, is now being actively worked, and turning out about 20 tons monthly. Both these fields will greatly increase their yield when the wet season comes in; thus we have large tin tracts extending from the Southern boundary of this colony to Stanthorpe, to the north of Cooktown, a distance of nearly 200 miles.

(R. Adams.)

SYDNEY, NEW SOUTH WALES, Sept. 3, 1880.—Copper.—After the customary vicissitudes of most mining enterprises the Cobber Copper Mine has at last proved a success. Twelve months since its shares could be got for 10¢; now they readily fetch 75¢ dividend. On the same general line of inquiry no new mines and no new Hope Copper mines, which, although as yet only promising ones, give every indication of being also very extensive and valuable, and as the railway is going out yearly in that direction, cheaper transit will add still more to their value year by year. The output of the Cobber Copper Mine from Jan. 1, 1878 to June 6, 1880, has been 1794 tons of pure Copper.

EAST INDIES.

(Gilliland, Wood & Co.)

SINGAPORE, Oct. 2, 1880.—Tin.—Purchases for the fortnight are under 10 tons, mostly at \$6.25 per picul, at which there are still buyers, but dealers, owing to market supplies to hand, are not willing to sell. Shipments from the Straits to the United States last month were 420 tons, making, for the nine months, 6,555 tons, against 6,553 tons for the same period last year. Freight.—The supply of disengaged tonnage is rather more than equal to the demand and rates are weak. For New York nothing has been done, and the Nancy Penitente is not yet a full ship. For Boston buyers have been no change. Exchange is steady at 5/10 for 6 months' sight credit drafts on London.

According to the last wreck register of the British Isles published by the Board of Trade, the total number of wrecks on the seas and coasts of the United Kingdom during the last 25 years is not less than 49,322, and the whole number of lives lost therein amounts to the enormous number of 18,319. It is observable that for several successive years the number of wrecks varies hardly at all; thus in 1855 there were 1141 wrecks; in 1856, 1153; in 1857, 1143, and in 1858, 1170. The disasters of this sort then increase over those of the preceding years, but hardly vary among themselves, there being 1416 in 1859, 1379 in 1860, 1494 in 1861, and 1488 in 1862. In 1863 there was just one wreck less than in 1865, and the largest number was reached in 1877-78, when it was 3611. The register, however, shows that 3302 lives have been saved from wrecks by means of the National Life-Boat Institution, the rocket apparatus of the Board of Trade and other agencies, in conjunction with efforts made on board the distressed vessels themselves.

Of late some of the most beautiful mosaics, both in design and material, have been produced by Russian artists in the imperial glass manufactory of Russia, the artistic excellence of which, it is asserted, has never been surpassed. The pieces of glass—technically called "smalts," and comprising every possible shade of color—are wrought into minute pictures of wonderful perfection, rivaling, in fact, those of Italy. The varieties of mosaic work peculiar to the latter country are known distinctively as the Florentine and the Roman, the former being entirely formed of pieces of stone or shell of the natural colors, and chiefly applied to floral and arabesque designs; while the Roman is made of the glass smalts, and has so wide an application that most of the finest paintings of the best old masters have been copied in mosaic. The manufacture of the opaque glass (or smalts) required for making the little square pieces called *tesserae*, of which the pictures are composed, is a very important one, as many as 25,000 different shades of the various kinds of colored glass being produced at the Vatican.

Thirty heavy locomotives are now being constructed at the Pittsburgh Locomotive Works, 10 of which are for the Texas Pacific Railroad.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

At an assignee's sale of the piano manufacturer of William H. Ivers, at Dedham, on Wednesday, J. F. Harlon bid in the manufacturer to Ivers, Pond & Co., pianoforte manufacturers, for \$3510, it being \$10 over the mortgage. The business will continue on, as formerly, under the firm name of Ivers, Pond & Co., and the firm intends manufacturing 15 pianos per week.

J. W. Gardner, of Shellburne Falls, is erecting a new cutlery factory, which will furnish room for the employment of about 300 men.

The Hampden Paint and Chemical Company, of Springfield, have recently reorganized with E. P. Chapin, formerly treasurer and manager, as president, and E. K. Baker as treasurer.

For the week ending Nov. 3, South Abington shipped 742 boxes, 14 cases and 35 kegs of tacks, nails, shanks and eyelets.

The new brick shop just completed for the Emery Wheel Company at Leeds, Northampton, is 70 by 30 feet, and built to make more room for the manufacture of machinery, which has grown to be a large part of the business. It contains 29 ovens for baking wheels. Each oven holds about 75 wheels. The old ovens are taken out of the main shop.

NEW YORK.

D. Saunders' Sons, Yonkers, have shipped to W. C. Ellison's Tube Works, Philadelphia, a No. 5 and a No. 6 pipe-cutting and threading machine.

Burdens' blast furnace No. 1 has started up again.

The iron furnace at Sterlingville is in full blast and using 900 bushels of charcoal a day. Most of the wood for five miles around is burned up already.

Elmira's Rolling Mill and Steel Works are crowded with orders.

PENNSYLVANIA.

The following is the record of the two furnaces of the Phoenix Iron Company, Philipsburg, for the week ending October 30, 1880: Product of No. 1 furnace, 281 19-100 tons of pig iron; anthracite coal consumed per ton of iron, 134-100 tons. Product of No. 2 furnace, 304 92-100 tons of pig iron; anthracite coal consumed per ton of iron, 122-100 tons. Previous to the rebuilding of these furnaces under the care of Mr. C. J. Rader, superintendent, the product did not average one-half of their present output.

The Brooke Iron Company, at Birdsboro, made 1820 kegs of nails in October.

The Isabella Furnace, in Berks County, which has been idle for some months, will, it is rumored, again be put in blast in a few weeks. During the time it has been standing idle a number of improvements have been added, besides the accumulation of a fair stock of charcoal.

Mr. Isaac Fegeley, one of the principal members of the Warwick Iron Company, left yesterday morning for Lebanon, where he was in consultation with Mr. Peter L. Weimer in reference to the furnace repairs and improvements. He subsequently left for Clearfield County, where he arrived last evening, the object of his journey being to inspect several furnaces in the Clearfield district, and make an examination of the Clearfield fire-brick. Mr. Fegeley is of the opinion that some article of fire-brick can be found which will prove superior to others for the lining of the Warwick Furnace. He has great faith in the Reading fire-brick, which is acknowledged by ironmasters to be unexcelled. The Warwick Furnace will be put in blast as soon as possible. Meanwhile the proprietors of other furnaces, who have been greatly interested in the experiments with the Warwick Furnace, will anxiously await developments.—*Reading Times*.

The Sheridan Furnaces are in full blast and doing well.

Total coal tonnage of the Philadelphia and Reading Railroad for the week ending November 6, 146,502 tons; corresponding week last year, 173,076; previously this year, 6,550,506; corresponding period last year, 7,562,591 tons. Decrease this year of 1,012,084 tons.

A charter was issued at the State department, Harrisburg, to the Combination Steel and Iron Company, formed for the purpose of doing business in the city of Chester. The capital stock is \$200,000, in shares of \$100 each.

Warner's Forge, at the Falls of French Creek, is again running on full time.

The opening of the branch of the Wilmington and Northern Railroad to that place has been of great benefit to the iron and mining industries of that portion of the country.

The Bechtelsville Furnace turned out 23½ tons of pig iron last week.

The coal product of the Schuylkill region for the week ending October 30, was 183,940 tons, as against 175,621 tons for the week previous, and 160,174 tons for the corresponding week of last year. The total product for the week was 641,789 tons, against 577,060 tons for the same week of last year—an increase of 64,729 tons. The total output for the year is 19,183,119 tons, against 21,311,807 tons for the corresponding period of last year—a decrease of 2,627,686 tons.

Work has been resumed at the rolling mill of Potts Bros.' Iron Company after a two weeks' suspension.

There is a rumor that a company has been formed for the erection of a rolling mill on the site of the old pipe mill in the eastern part of Lebanon. Messrs. Robert H. Coleman, A. Wilhelm, D. S. Hammond, C. B. Forney and others are said to be interested in the enterprise. The ground has been staked off and work is to be commenced immediately.

The Pottsville Iron and Steel Company are a new concern for the manufacture of iron and steel at Pottsville. This is a large corporation. The capital stock is \$450,000, in 9,000 shares of \$50 each. The president is Charles M. Atkins, with William Atkins as treasurer, and they, with David C. Henning, form the Board of Directors.

Ripley & Co., Eighth, Ninth and Bingham streets, Southside, are doing a heavy business, requiring the full output of their factory to meet the demand.

We learn that the great anvil block cast several weeks ago at the Black Diamond Steel Works has cooled off sufficiently to permit the workmen to place it in position. Soho Furnace made during October 3514

petent judges say no furnace could work. During the short blast mentioned, 3800 tons of iron were made in less than ten weeks, of which 1000 tons were foundry iron. During the last blast, of less than nine weeks, 3500 tons were made, all of which is gray foundry iron, except 250 tons of No. 3, showing that the probability of melting out is equally as great with foundry iron as with mill iron. These facts conclusively disprove the theory that the furnace had been pushed, it being impossible to make foundry iron when a furnace is blown beyond its capacity.

It is reported the Philadelphia and Reading Railroad has made a contract with the Standard Oil Company for the transportation of the latter's oil. By the terms of this contract the Standard will build its pipe line only from Bradford to Milton, instead of to the seaboard, as contemplated, and oil will be conveyed from that place to the Standard's large refineries at Communipaw by rail. It is understood the Reading Company will receive such low rates for compensation as to leave a very small margin of profit, if any.

An application has been made to the State Department for a charter for the Cresson Coal Company, formed for the purpose of mining coal at Cresson, Cambria County. The office of the company will be in Philadelphia. The capital stock is \$200,000, divided into 4000 shares of \$50 each. Philip F. Kelly, of Philadelphia, is treasurer, and the directors are George F. Huff, Greensburg; B. K. Jamison, William M. Stewart, J. H. Kershaw and Thos. Collins, Philadelphia.

PITTSBURGH AND VICINITY.

Preparations are being made at the Black Diamond Steel Works of Park Bros. & Co. to cast the first steel shaft for steamboats ever manufactured in America. Heretofore such shafts could only be made at Krupp's famous works in Germany, and it was only last week that a Pittsburgh towboat, the Joseph B. Williams, was supplied with one of these shafts, transported especially for it from Germany, and placed in the boat at Cincinnati. Since the immense steam hammers have been cast at the Black Diamond Steel Works, Pittsburgh will also be able to cast these large shafts, saving to steamboatmen the cost of transportation from Germany. Pittsburgh is the only place in the United States where such immense work can be turned out.

McKee & Bros., Eighteenth street, Southside, are still very busy, selling all the ware they make, and unable to catch up with old orders. Considering the large number of new factories and the great increase in the aggregate of ware produced in the country, the firm are entirely satisfied with the business they are doing.

The demand for tubes at the Atta Pipe Mill is so large that the managers find it necessary to employ another crew of men in addition to the two crews which have been working day and night. Constant employment could be given to all of their pipe mill hands, day and night, if sufficient gas could be obtained. The last set of men employed commence at 12 o'clock, noon, which enables them to get gas from the heating furnaces in the rolling mill. Their turn is completed early in the afternoon.

Messrs. Oliver Bros. & Phillips are adding a plate plant to their works on Tenth street, on the Southside. The roll train, for which Garrison & Co. have the contract, will be of the Lauth three-high type, the top and bottom rolls being 25 inches in diameter and the middle one about half that size. The engine is being made by Robinson, Rea & Co., and the shears (40,000 pounds) by J. L. Lewis.—*Daily Dispatch*.

The Richards & Hartley Glass Company, Pride and Marion streets, are fully employed, orders being largely booked ahead, so that no goods accumulate in warehouses. Their trade has been steady, and bids fair to continue so for some time to come. They are running mainly on staples, but have some novelties for the holiday trade.

The Lamp Chimney Manufacturers' Association of the United States met on the 10th inst., in the Monongahela House, Parlor No. 4. The meeting was well attended, representatives of the trade coming from New York, Brooklyn, Boston, Philadelphia, Steubenville, Bellaire and Ravenna, Ohio, White Mills and all places in Pennsylvania where lamp chimneys are made. Mr. James Gillerden, of Philadelphia, presided, and Mr. Vankirk was secretary. The meeting was held with closed doors, but so far as could be learned, the proceedings were harmonious, and, generally speaking, the members' views were about the same. Figures showing the amount of stock on hand were submitted yesterday, and after the situation had been reviewed in every aspect possible, it was decided that there was but one measure for relief, and that was to restrain production. A resolution to shut down all the factories in the country for four weeks preceding January 10, 1881, was adopted.

The much-talked-of new glass works at Rochester have at last become a reality, the capital stock all subscribed and the ground for the erection of the building purchased.

The new company is to be known as the Rochester Flint Vial and Bottle Works, Limited, with a capital stock of \$20,000, 40 per cent. of which has already been paid in. The new works will be located at the intersection of the Ohio and Big Beaver rivers, commonly known as "the Point," where the ground has been purchased for the sum of \$41 for 16-inch, with hand lift and all, payable July 1, with the usual discounts for cash. Where sales exceed \$500, an extra discount of 5 per cent. is allowed; on cultivators, wood-beam walking cultivators are put at \$17, net, and iron beams \$1 higher; combined cultivators, \$25; and riding cultivators, \$26; all payable October 1, with the usual discount for cash. Where sales exceed \$500, 2½ per cent. additional discount is allowed, and where the amount reaches \$750, the discount is set at 3½ per cent. All the factories agree to make a sworn statement on the roth of each month. Each concern puts up a forfeit, and in case of any violation of the agreed prices, the money reverts to the association.

The Secretary of State has issued a license to organize to the Kasterbin Type Setting Machine Company, of Chicago; capital, \$45,000. Incorporators: John Marder, A. P. Luse and Carl Miller—all well-known citizens.

The celebrated Corliss engine is rapidly being placed in position at the Pullman Works, at Pullman. It is expected that it will be in working order by December 30.

B. Davies & Bro., contractors and manufacturers of silver-smelting furnaces and all descriptions of boilers, inform us that they have all they can do in their line and employing all the men they have capacity for. They have a contract with the Union Iron and Steel Company, at Thirty-first street, near Ashland avenue, for lining all their furnaces. Their works are located at 494 Twenty-sixth street, Chicago.—*Journal of Commerce*.

Benson & Gillett's extensive tile works, Aurora, were burned last week. They will be rebuilt.

Eaton & Prince, manufacturers of general

machinery, are manufacturing a quantity of barbed-wire machinery—capacity, 10,000 pounds per day—to be sent to the Hazard Mfg. Co., of Wilkesbarre, Pa. They are also constructing four barbed-wire machines for the Hawkeye Mfg. Co., Burlington, Iowa. They run their factory overtime, and are three months behind their orders.—*Industrial World*.

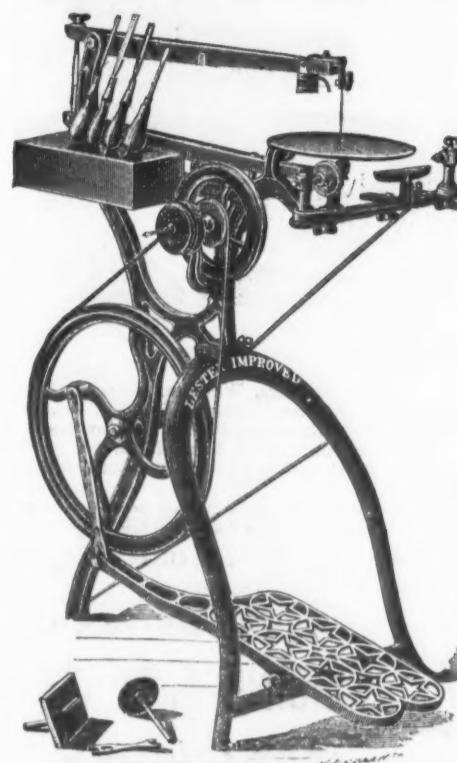
Mr. William Deering, Chicago, manufacturer of the new Marsh harvester, recently shipped a number of twine binders to England.

The Orvis Smoke-Consuming and Fuel-Saving Company is a new corporation recently established in this city, for the manufacture and sale in the State of Illinois of the Orvis Smoke Consumer. The following is the list of the officers of the company: W. C. Graanis, vice-president Union National Bank, president; Benj. Allen, wholesale jeweler, vice-president; F. G. Saltonstall, stock broker, secretary and treasurer. The directors are O. D. Orvis, W. C. Granis, Benj. Allen, F. G. Saltonstall and A. F. Noble. A stock company has been formed in Cleveland for the sale of the Orvis smoke consumers in Ohio, and another is being formed in St. Louis for the control of the sale in Missouri. We also understand that the right to manufacture the Orvis smoke consumers in the State of Louisiana has been sold to parties there who intend to form a company for that purpose.—*Chicago Industrial World*.

KENTUCKY.

The Norton Furnace is making an average of 50 tons on

THE LESTER SCROLL SAW.



Scroll Saws are now as staple in Hardware stores as nails, and are to be found by most dealers. They are in demand everywhere, and make trade lively about Christmas time when it would otherwise be dull.

The Lester Saw

Is the most perfect one use, and embraces a Scroll Saw, Circular Saw, Drilling attachment with Drill, Turning Lathe and tools, solid Emery Wheel, Patent Dust Blower, Patent Saw Clamps, Tilting Table, Wrench, Screw Driver, Designs, extra Saw Blades, &c. It has a black Japan finish with red and gold stripes and nickel-plated Table. List price, complete, \$10.

Rogers Saw

Comprises Scroll Saw, Drilling attachment with drill points, Dust Blower, Tilting Table, Patent Clamps, Wrench, extra Saw Blades, Designs, &c. Finish same as Lester Saw. Price, \$3.50.

Cricket Saw.

This Saw has the same general appearance as the Rogers Saw, but is lighter and has no Drilling attachment or Dust Blower. Finish same as the other Saws. Price, \$2. It is by far the best \$2 Saw in the market.

All our Saws are made of iron with steel working parts. No charge is made for boxing.

Millers Falls Co.,
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Hardware Commission Merchants,
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E. & G. BROOKES "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
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AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
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STEELE & SONS' Wrought Handle Sad Irons.

Also a large line of Heavy and Shelf Hardware.

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PROVIDENCE, R. I.

SCRAPERS,

FOR SHIPS, ICE, FLOORS,
WALLS, CEILINGS, &c.



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RIPLEY MANUFACTURING CO.,
Unionville, Conn., U. S. A.



BEST PORCELAIN-LINED LEMON SQUEEZERS.
"Common Sense" Mouse Traps.
HAND-MADE ROSEWOOD FAUCETS.
Housefurnishing Hardware.
FOR HOME AND EXPORT TRADE.

DAVID HYMES & CO.,
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MANUFACTURERS' AGENTS.

Bargains in Hardware & Cutlery.
Low estimates made on all kinds of SMALL CASTINGS, in the Rough, Japanned or Varnished.

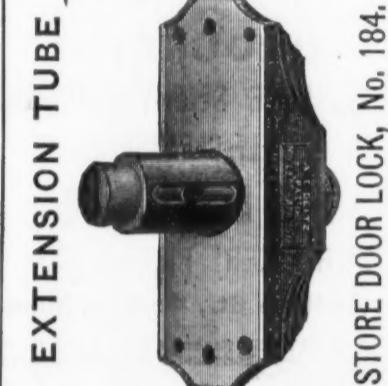
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Horse Nail Co.**
MANUFACTURERS OF
FINISHED
(BRIGHT OR BLUED)



These nails are made of the best brands of NORWAY IRON, and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,
VERGENNES, VT.
DURRIE & McCARTY, Agents,
No. 97 Chambers St., New York

A. E. DEITZ,
(Successor to Barnes & Deitz.)
Manufacturer of
Store Door Locks, Night Latches, Padlocks, Drawer Locks, &c., with Flat Steel Keys.



Durrie & McCarty, Agents,
97 Chambers & 81 Reade Sts., New York.

**WALKER'S
Forged Horse Shoes,
SHOENBERGER'S
Patent Toe Calks,**
Superior to any in market.
Send for prices and samples.

A. BUSSING, General Agent,
4 Warren St., New York.

Peckham's "NEW IDEA"
3 lb. Mica Package for 1880.
PRICE REDUCED.

Put up expressly for Retail Dealers who desire to buy small quantities and a variety of desirable and saleable sizes. Put up in a neat and attractive Show case.

TWELVE SIZES OF MICA,
of the very best quality.

1/4 lb. 1/4 lb.

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ordinary route, while the distance straight down the snow-covered mountain was only three. He had such a pan as miners used in washing out gold. Squatting down in this, away he went, faster and faster until the solder of the vehicle was melted by friction, and he was almost insensible from lack of breath. But the trip was quickly over without any mishap, and the passenger now declares that he enjoyed it. People with no appreciation of a story would ask whether the pan, when made so hot by friction as to melt the solder, did not raise blisters on that part of the miner's person in immediate contact with it; but it is not well to inquire too curiously into such matters.

The Death of Col. Drake.

The death of Col. E. L. Drake, the first man to sink a well in Pennsylvania in search of oil, and the pioneer in the petroleum business of that State, is announced as having occurred in New Bethlehem, Penn., on Monday last. Like the majority of the early operators in oil, he made a fortune, lost it, and in his declining years found himself in poverty. Unlike many of the same class, however, he was not reduced to abject want, for the State of Pennsylvania, recognizing the benefits which he had derived from his ingenuity and enterprise, granted him a pension, which has been the support of himself and family now for several years.

It was by the merest accident that Col. Drake's attention was first directed to the value of petroleum in 1858. Half a century before that date old Nat Carey had peddled the peculiar oil which was skimmed in small quantities from the waters of Oil Creek, and had paraded its virtues as a purgative and liniment. He called it Seneca oil, from the fact that Red Jacket, the Seneca chief, had imparted to the whites the secret of its powers. Its fame as a medicinal agent was purely local when Carey, with vials of the stuff, plodded from hamlet to hamlet and established a demand for it that brought him no small profit. An attempt by Gen. Franklin to introduce this "great natural medicine" to a Southern market later on ended disastrously, the Baltimore merchant to whom a wagon-load of it was consigned dumping it into the Chesapeake Bay, unable to endure the odor which it sent forth, and unwilling to believe that his Southern customers could accustom themselves to the remedy, no matter what the nature of their ailments. Northern patients, however, took more kindly to it, but among them even it was known more as a liniment than as a medicine.

For several years, until 1858, a firm in this city, Evelith & Bissell, had received from Titusville, Penn., about a gallon of this oil a day, which, mixed with other ingredients, they sold as the then celebrated "Mustang Liniment." Their supply of oil was gathered in the very primitive method of dipping blankets in a spring permeated with the article and wringing them into pans. This spring was owned by the firm, and when they were unable to meet their indebtedness to persons in New Haven, Conn., the latter took the Titusville property in payment. This was in 1858. Col. Drake was then a conductor on the New York and New Haven Railroad. His shrewdness had already attracted the attention of the owners of the newly acquired property. They sent him to Pennsylvania to perfect their title to it. He became satisfied from his observations that Seneca oil was possessed of more properties than had ever been credited to it, and that a fortune was in store for the man who could secure it in any quantity. He suggested the idea that the oil could be obtained in paying quantities by sinking a well. He was laughed at as a lunatic by the Pennsylvanians. Returning to New Haven he succeeded in interesting some capitalists in the novel theory, and in organizing the Seneca Oil Company, of which he was appointed manager. In the Spring of 1859 he commenced sinking a well on Watson's Flat, at a spot about a mile below Titusville. The move was considered so ridiculous that it was only with the greatest difficulty he could hire assistance in the work. He finally secured the services of an old salt-borer named William A. Smith and his two sons. The boring of the first petroleum well was begun on the 1st of July, 1859. When the three men quit work at sundown on the 29th of August they had drilled to a depth of 60 feet 6 inches. The elder Smith was first at the hole the following morning, and to his astonishment it was filled with oil. A barrel of it was dipped out in a few minutes, and the news of Col. Drake's sanity ran like wildfire up Oil Creek Valley. The discovery was flashed over the country, and then began the ever memorable oil excitement which made and beggarred men before it subsided. To-day the oil region is honeycombed with wells, the supply of petroleum far exceeds the demand, and farmers who own no oil stock are skimming, from the waters of the same creeks over which old Nat Carey labored, hundreds of gallons of the stuff which is running to waste.

Col. Drake continued his operations in petroleum until 1864, when, broken in health and ruined in pocket, although at one time he had amassed a princely fortune, he abandoned the oil fields. In 1873 the State granted him a pension of \$1500 a year, payable to his wife in the event of her surviving him. He settled in New Bethlehem, where he spent the last years of his life a confirmed invalid. His co-pioneer, Smith, still lives in Butler County, Penn., destitute, and with a large family on his hands. A statue to Col. Drake's memory is to be erected on the new Oil Exchange now being built in Titusville.

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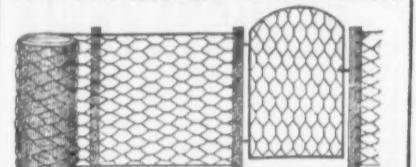
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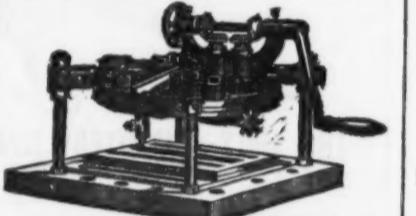
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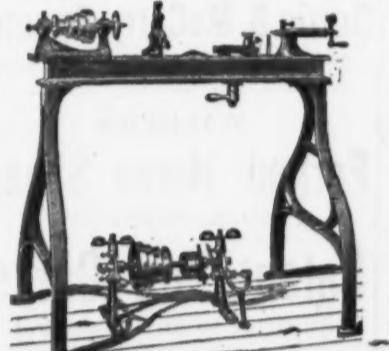
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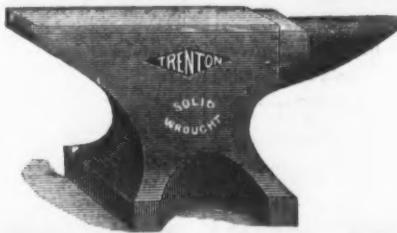
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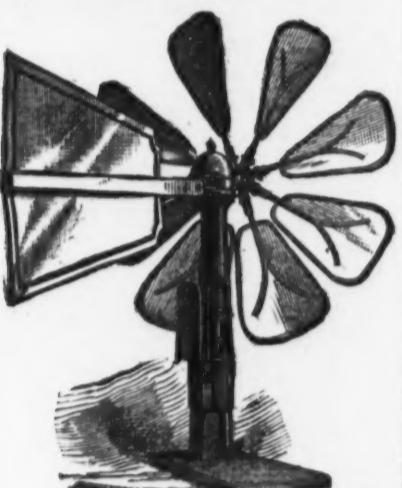


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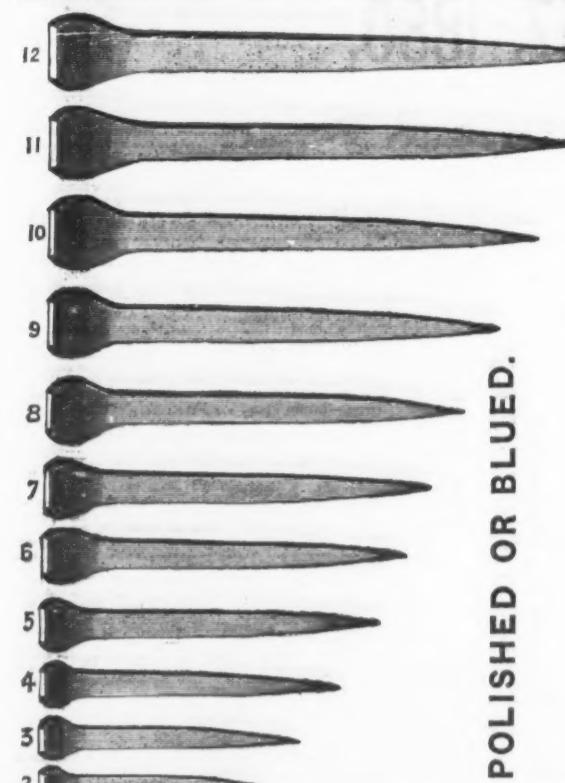
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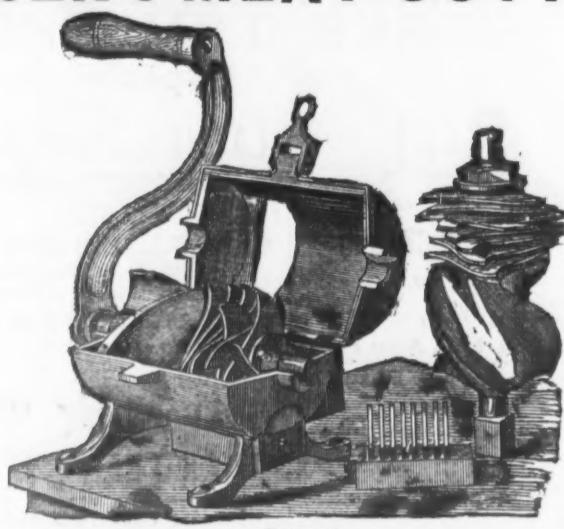
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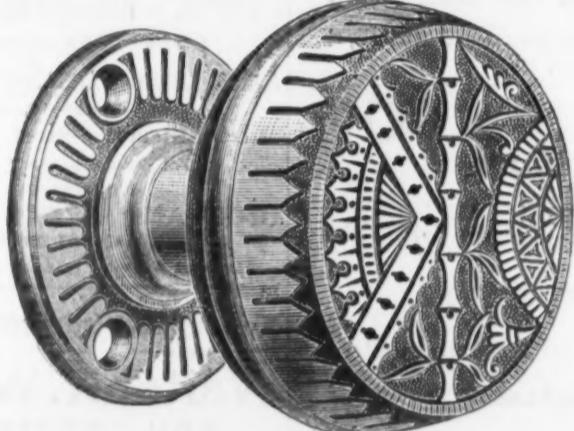


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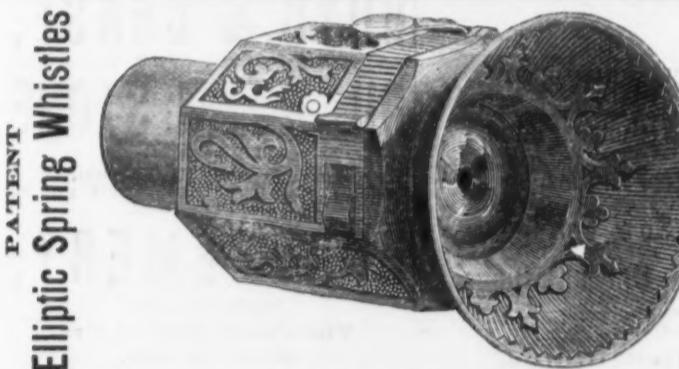
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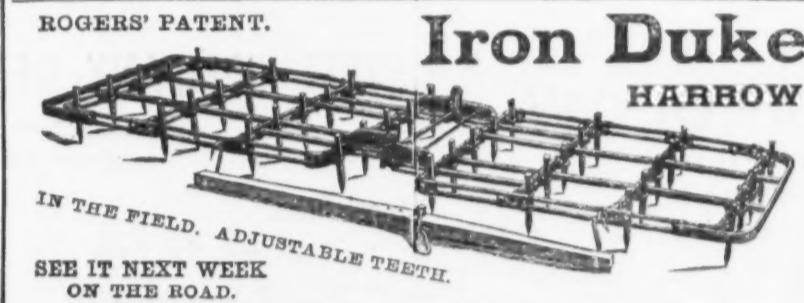
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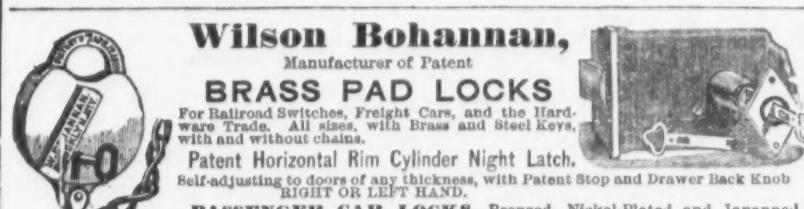
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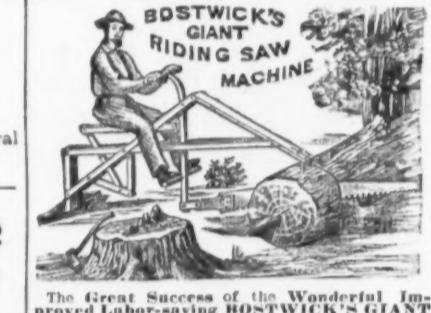
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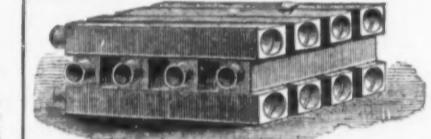
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All the regular sizes in stock, with Nozzles to fit
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They are fine in appearance, durable and very cheap. They are put up in sets in handsome imitation Morocco boxes, or any of the articles alone in common boxes.

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Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

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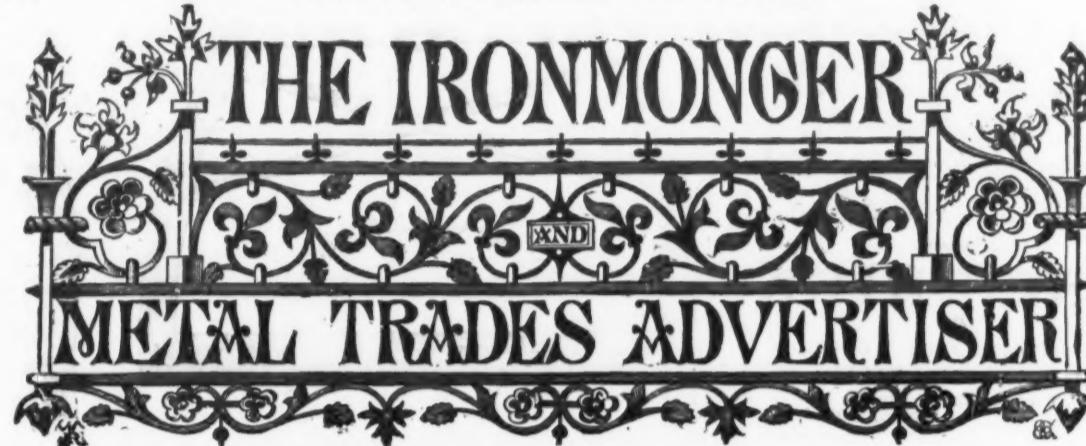
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November 18, 1880.

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Manufacturers of

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BORGNER & O'BRIEN,
Manufacturers

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Edge Pressed Furnace Blocks,

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Twenty-third Street,
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Twenty years' practical Experience.

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Successors to

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For Rolling Mills, Blast Furnaces, Foundries,
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Fire Clays, Fire Sand, and Kaolin for Sale.

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Established 1844.

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SEND FOR PRICES.

Watchman's Improved Time Detector,
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Patented 1876-7.
Beware of imitations. This instrument is supplied with 12 keys for 12 different stations. Invaluable for all concerns employing men who must leave their posts to attend to other business. Send for circulars to E. IMHAUSER,
212 Broadway, N. Y.
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KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

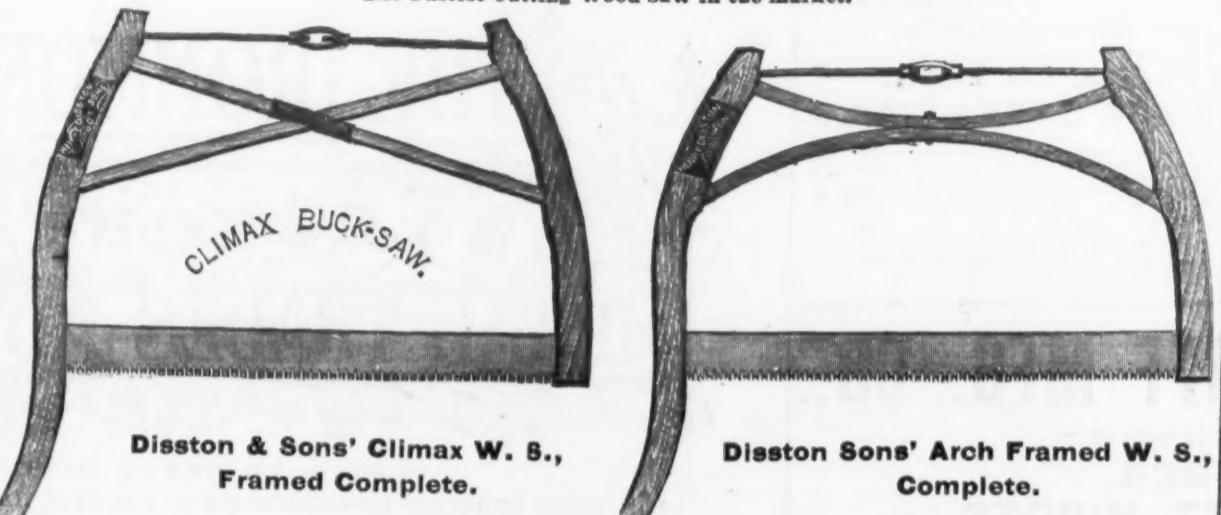
Front and Laurel Streets, PHILADELPHIA.

PATENT GROUND AND TEMPERED PEG TOOTH WOOD SAW BLADES, SET AND SHARPENED.



No. 77.—Disston's Improved Wood Saw Blades, Set and Sharpened.

The Fastest-Cutting Wood Saw in the market.

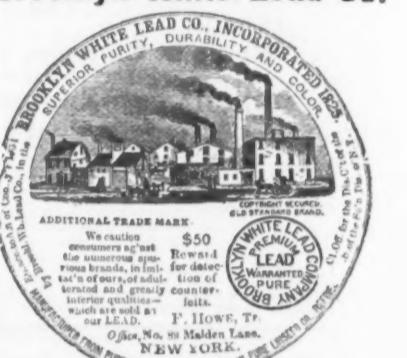


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John T. Lewis & Bros.
No. 231 South Front St.,
PHILADELPHIA.



Brooklyn White Lead Co.



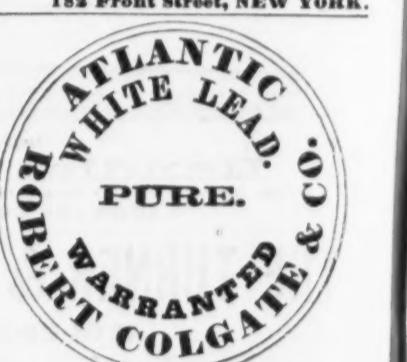
White Lead, Red Lead & Litharge.

No. 182 Front Street,
NEW YORK.

JOHN JEWETT & SONS,
Manufacturers of the well-known brand of
WHITE LEAD.



ALSO MANUFACTURERS OF
LINSEED OIL.
182 Front Street, NEW YORK.



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and Linseed Oil Co.,
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SASH CHAINS,

With Patent Attachments.
Warranted for years. Chains of any size made to
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THE "EAGLE" ANVIL.



LATEST PATENT
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WARRANTED!!

Better than the Best English Anvil.
Face in one piece of BEST TOOL CAST STEEL, PERFECTLY
WELDED, perfectly true of hardest temper, and never to come off
or "soffle." It does not bounce the hammer back, and therefore
can do more work with lighter hammer. Horn of tough untempered
steel, never to break or bend. Only Anvil made in United States
fully warranted as above. None genuine without our trade-mark.

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Weighing about

No. 1 36 4 10 15 20 30

No. 2 36 3 8 7 9 10

Weighing about

No. 3 40 5 60 70 80 90 lbs.

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November 18, 1880.

THE IRON AGE.

33

PHILADELPHIA.

(Corrected Weekly by Lloyd, Supplee & Walton.)
Terms, 30 days. For 60 or 90 days, interest added at 10 percent, per annum.

| Anvils. | |
|--|-------------|
| Peter Wrights, W. B. | 10% |
| Over 100 lbs. | 110 |
| Each (American). | 10c per lb. |
| Apple Pares. | |
| Keystone Centennial, 1875. | 10c |
| Reading No. 72. | 5.00 |
| " No. 74. | 5.00 |
| " No. 76. | 7.50 |
| Rotary French Pares. | 15.00 |
| Lots of 10 to 25 dozen special prices. | |

| Axes. | |
|---|--|
| Hilt's Kentucky and Yankee. | per doz \$1.00 |
| Mann's Red Warrior. | 11.00 |
| Kichland Chief. | 10.00 |
| Beverly Axe. | add 10c |
| Douglas Axe. | 22.00 |
| Anglers and Auger Bits.—New List January 1. | |
| Bates' Nut Augers. | list 40c |
| Cook's Augers. | 40c to 50c |
| Benjamin Pierce Auger Bits. | 40c to 50c |
| Griawood Auger Bits. | 40c to 50c |
| Cook's. | 40c to 50c |
| Jenner's. | 10c to 10c to 10c |
| Bonney's Pat. Hol. Augers, list 40c to 50c. | list 20c to 25c |
| Stearns' Pat. Hol. Augers, list 40c to 50c. | list 20c to 25c |
| Balances. | Auger and Common. |
| Bells. | Bevin Bros. Mfg. Co. Light Hand Bells, list 60c to 80c |
| Swiss Pattern Hand Bells. | low list 10c to 15c |
| Connell's Dog Bells. | list 35c to 50c |
| Oliver Wood & Son's Gongs, new list. | list 50c to 75c |
| Bolt and Rivet Clippers. | |
| Chambers' No. 1. for 16 bolts, each, 97.50. | |
| " No. 2. " " 90.00. | list 15c to 20c |
| " No. 3. " " 12.00. | |

| Boring Machines. | |
|--|---|
| Upright, without Augers. | List 5.50. |
| Angular, without Augers. | 6.75. |
| Bolts.—Eastern Carriage Bolts. | list 70c to 10c |
| Philadelphia. | new list 60c to 10c |
| Stanley, Wrought Shutter. | 60c to 10c |
| Brones.—Barber's. | list 60c to 10c |
| Bolts. | Spofford. |
| American Ball. | list 40c to 10c |
| Bolts—Cast Fast Joint, Narrow. | list 40c to 10c |
| " " Broad. | list 40c to 10c |
| Cast Loose Joint, Narrow. | list 40c to 10c |
| " " Acorn, Loose Pin. | list 40c to 10c |
| " " Ball Joint. | list 40c to 10c |
| " " Maven's Loose Joint. | list 40c to 10c |
| Wrought Loose Pin. | list 40c to 10c |
| Table Hinges and Back Flaps. | list 40c to 10c |
| " " Narrow, Fast. | list 40c to 10c |
| " " Loose Joint. | list 40c to 10c |
| Blind Bolts. | Parker. |
| Clark. | list 70c to 10c |
| Shop Bolts. | list 60c to 10c |
| Lull & Porter. | list 60c to 10c |
| Hufers. | list 60c to 10c |
| Chains.—German Halter and Coil, new list Oct. 22, 1879. | list 70c to 10c |
| Galvanized Pump. | list 40c to 10c |
| Best Proof Coil Chain—English. | list 80c to 10c |
| " " 12 to 10 8d 7d 7d 7d 7d gold. | list 7.15 to 1.75 |
| Chisels—Socket Framing. | list 60c to 10c |
| Socket Firmer. | list 60c to 10c |
| Casters.—Bed (new list July 1, 1880). | list 20c to 10c |
| Plate. | list 20c to 10c |
| Coffee Makers, and. | list 20c to 10c |
| Enterprise. | list 35c to 50c |
| Cutterly.—Walder's Pocket. | new list net |
| Lancaster, Pa., C. J. Russell & Co., Lamson & Goodwin Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net. | |
| Drawing Knives. | Ridge Co. ". |
| Hatching Knives. | Automatic Handle. |
| Fry Pans. | Tinned. |
| " " 40c to 50c. | list 45c to 50c |
| " " 50c to 60c. | list 50c to 60c |
| " " Burnished. | list 50c to 60c |
| " " 60c to 70c. | list 50c to 60c |
| " " 70c to 80c. | list 50c to 60c |
| " " 80c to 90c. | list 50c to 60c |
| " " 90c to 100c. | list 50c to 60c |
| Fluting Machines. | each, 50c to 10c |
| " " 10c in. roll. | 2.50 |
| Crown " in. roll. | 3.50 |
| " " 15c in. roll. | 4.00 |
| " " 20c in. roll. | 4.50 |
| Geneva Fluter. | list 20c to 50c |
| Favorite com Fluter & Sad Iron. | list 50c to 100c |
| Hammers. | list 20c to 50c |
| Hatchets. | Yerkes & Plumb's, new list. |
| Hunt. | list 20c to 50c |
| Hunting Axes. | list 15c to 50c |
| Strap and T. | list 40c to 10c |
| Horse Nails. | Nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. |
| Assurable. | 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60. |
| " " Blued and Pointed. | 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61. |
| Globe. | New list, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61. |
| Clinton. | 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60. |
| Porter. | 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61. |
| Porter, all sizes. | list 20c to 50c |
| Discount on Assurable and Clinton, 20c to Globe, 10c. | |
| Locks and Keys. | Locks and Keys. |
| Brasford. | list 20c to 50c |
| American Padlocks. | list 20c to 50c |
| Scandinavian Padlocks. | list 20c to 50c |
| " " 50c to 60c. | list 20c to 50c |
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IMPROVED PIPE-FITTERS' VISE.



To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work-benches, attached to angle plate or can (unlike others) be held between the jaws of any Machine. It is made of Blacksmithed Iron, the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without shifting it from one side of the jaws. The body of the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is strong, light, efficient and cheap which can be readily carried about with kit of tools.

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NEW BEDFORD, MASS., Sole Manufacturers of

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W. C. WREN'S PATENT GRATE BAR.

This Grate Bar consists of short parallel bars for carrying the coal mounted above a long supporting bar, extending across the furnace by short transverse plates, holding the short bars, which sustain the heat so far above the supporting bar that it is kept comparatively cool, and is not, therefore, liable to warp, bend or burn. The bars which are subject to the heat, being made in short sections, do not strain the supporting bar. The short bars break joints at the meeting ends to prevent a straight open space through the whole; also to guide the rake used by firemen in cleaning the furnace better than any other way.

We therefore claim the following advantages over other grate bars offered for sale:

1. Great saving in fuel.
2. Such construction as will equalize all strain resulting from expansion and contraction, thus avoiding warping, and thereby insuring long service.
3. Thorough combustion of fuel, owing to the large air spaces exposed.
4. Bars will not weigh more in proportion than the ordinary bar, and in addition to a saving of 25 per cent in fuel, will last much longer than any other bar in use.

The WREN GRATE BAR is in use at the works of the Atlantic Refining Co. and other prominent concerns.

ASBESTOS MATERIALS, FIBER, MILLBOARD, PACKING & CEMENT.
THE NATIONAL STEEL TUBE CLEANER.

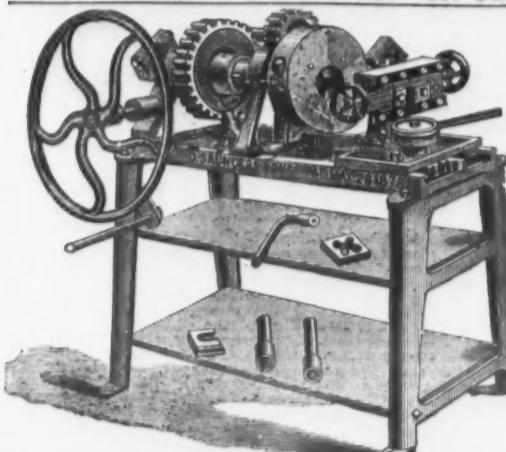
Saves its cost every time it is used.

The Patent "Air Space" Coverings for Steam Pipes, Hot-Blast Pipes, Boilers, &c.



Plastic or Hair Felt, with or without the Patent "Air Space" Improvement.

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PIPE-THREADING
MACHINE,
FOR
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The IXL.

Manufacturers of
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Send for circulars.

PHILADELPHIA SCREW CO., Limited,
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Manufacturers of

IRON & BRASS WOOD SCREWS.

Quality, finish and tests as to strength guaranteed equal to any in the market.

With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.

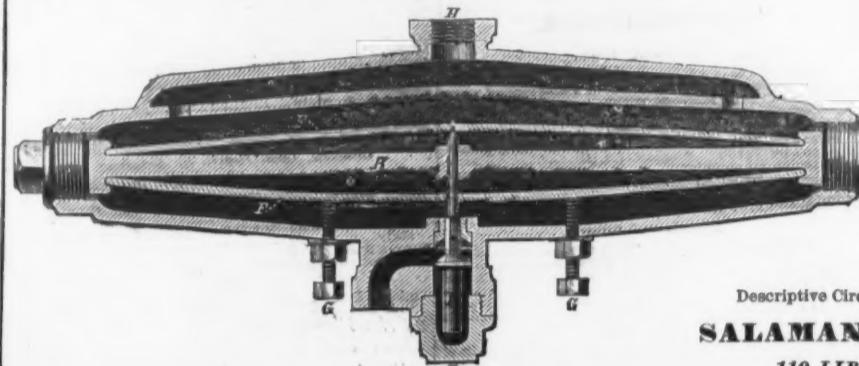


Manufacturers of GALVANIZED PUMP CHAIN FOR CHAIN PUMPS.



Expanding, Self-Draining
RUBBER BUCKET.
Manufactured only by
L. M. RUMSEY & CO.

BLAKE'S PATENT POSITIVE STEAM TRAP.



This Trap is adapted to all places where steam is used for heating or drying purposes. It is simple in construction, positive in its working, and much lower in price than any other Trap.

Descriptive Circular sent on application. Address
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WHITWELL HOT BLAST STOVES.

600 IN USE.

Witherow & Gordon

Sole Agents U. S.,

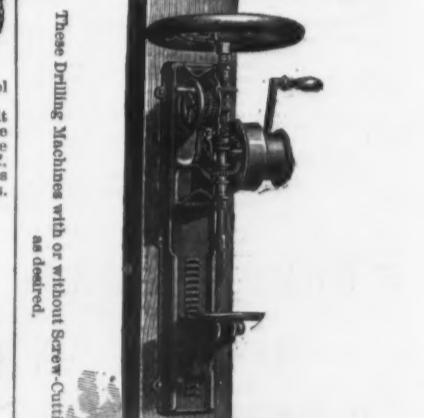
173 WOOD STREET,
PITTSBURGH, PA.,

Blast Furnace Engineers,
Machinists and
Contractors.

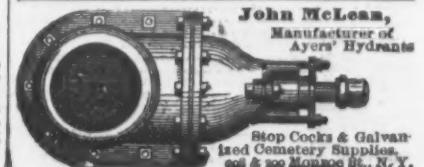
Wiley & Russell Mfg. Co.,

Greenfield, Mass.,
LIGHTNING
Screw-Cutting Machinery
and Tools.

Bolt Cutters for Hand or Power, Lightning Screw Plates cutting from Wire Sizes to 1 1/2 inch, Pipe Taps and Dies, Taper Reamers for Use in Bit Brace on Wood or Iron, Taps and Dies for Bit Brace.



Green River Drills for either hand or power.
1. Tire Binders.
2. Tire Upsetters.
3. Horse Shoers' Machines.
4. Tire Measuring Wheels.
Tire Bolt Wrenches, Nut Wrenches, &c., &c.
Special Screw Plates for use with stock or in the Bit Brace.
Send for Illustrated Price List.



COVERT'S

Patent Improvement in



ROPE GOODS.

No more Splicing or Winding

Ends with Cord.

No. 1.

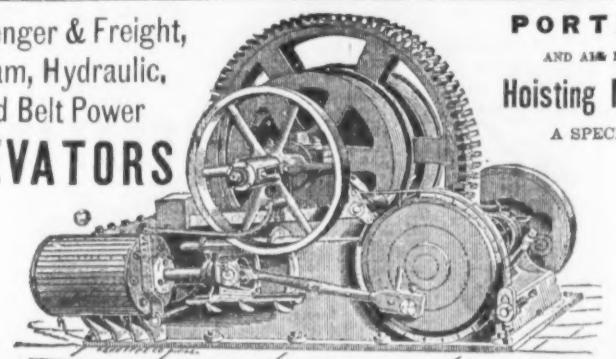
Rope Halters, Horse Ties, Cattle Ties, Halter Leads, &c., made by clamping the lap with steel rings, as shown in cut. Also, clamping the end with a ring to prevent unbraiding. This is all accomplished by machinery, and a superior article can be made at so much less cost, it will not pay any one to make up goods the old way. We are now prepared to furnish the trade the cheapest and best Rope Halters ever made. No. 1 illustrates the twisted and irregular form of the spliced Halter; also the insecure method of whipping the end with cord, which invariably comes off, and allows the rope to untwist. No. 2 illustrates the New Halter. It is made by clamping the laps with steel rings. The end is also secured with a steel ring, which will remain as long as the rope lasts. We have also a full line of

COVERT'S HORSE AND MULE JEWELRY.



Consisting of Covert's Celebrated Harness Snaps, Swivel Snaps, Open Eye Bit and Chain Snaps, Snap and Thimble for Horse and Cattle Ties, Rope Goods, consisting of Horse Ties, Cattle Ties and Halter Leads, Leather Horse Ties, Breast Chains, Halter Chains, Post Roads, &c. These goods are far superior to anything of the kind on the market. They have from real merit become standard, and never fail to give entire satisfaction. They are sold by all leading jobbers in general and saddlery hardware at manufacturers' prices. Send for illustrated catalogue and price list.

Passenger & Freight,
Steam, Hydraulic,
and Belt Power
ELEVATORS



PORATBLE
AND ALL KINDS OF
Hoisting Machinery
A SPECIALTY.

IRON FURNACE HOIST,

For Handling Stock to Top of Stack with One or Two Platforms.

STOKES & PARRISH, 3001 Chestnut St., Philadelphia.

THE MACKENZIE PATENT CUPOLA & BLOWER.

Send for circular to

Smith & Sayre Mfg. Co.,

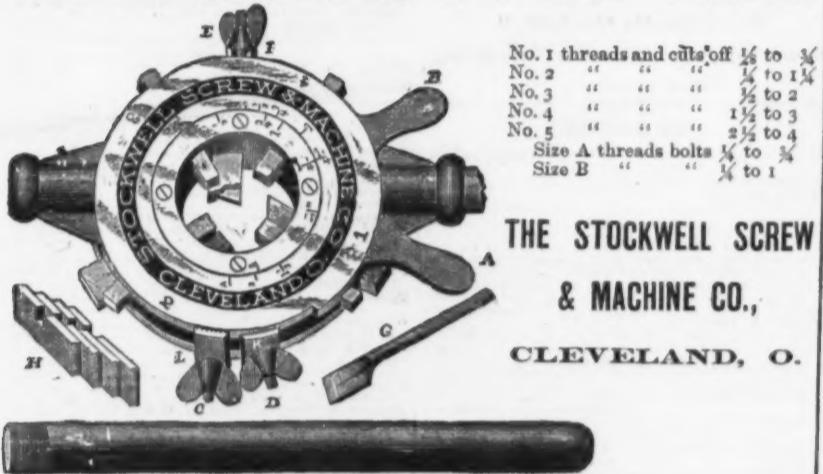
PROPRIETORS, 21 Cortlandt St., New York.



This Cupola has made a great revolution in melting iron. It differs from all others in having a CONTINUOUS THERM, or in other words, the blast enters the fuel at all points, and one ton capacity is held in the area made oval in form. This brings the blast to the center of the furnace with the least resistance and smallest possible amount of power, and in combination with the continuous tuyere causes complete diffusion of air throughout the furnace, and uniform temperature throughout, in a few minutes an hour, with the pressure of heat required to melt two or three tons in an ordinary Cupola. It also enables us to save very largely in time and fuel, the experience of our customers showing a gain of twenty-five to fifty per cent. in time, and twenty-five to forty per cent. fuel over the ordinary cupolas, and especially in light work. This is due to the thorough diffusion of the air and more perfect combustion, extracting less carbon from the fuel than any other furnace.

We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacity in tons per hour, as follows: No. 1, 1 ton; No. 2, 2 tons; No. 3, 3 tons; No. 4, 4 tons; No. 5, 5 tons per hour, and so on up to 18, or 20 tons. We have improved the construction of these Cupolas in every way, have increased their strength, and done much to make them as convenient for working as ropes and pulleys, our own and the experience of our customers could suggest.

MAGIC PLATE FOR PIPE.



\$\$\$\$\$ SAVED \$\$\$\$

1977 NINETEEN HUNDRED SEVENTY-SEVEN 1977
MACHINES
BOTH NEW AND SECOND-HAND

COMPRISSING
MACHINE AND BLACKSMITH
TOOLS OF EVERY DESCRIPTION.
WOOD-WORKING MACHINERY IN ALL ITS
BRANCHES. PORTABLE ENGINES. UPRIGHT AND HOR-
IZONTAL STATIONA RY ENGINES, 1 TO 300 HORSE POWER. S.C.F.&CO.
BOX, HORIZONTAL, LOCOMOTIVE FIRE-
ERS, 1 TO 100 HORSE POWER. WATER WHEELS, COT-
TON AND WOOLEN MACHINERY, STEAM
PUMPS, CRISTMILL MACHINERY,
Etc., FULLY DESCRIBED, AND
PRICES ANNEXED.

Send stamp for same, In our List No. 23. stating what you want. We have the Largest Assortment of Machinery to be found in the hands of any firm in the country.

Works and Main Office,
Manchester, N. H. **S. C. FORSAITH & CO.**

Branch Office and Wareroom, 209 Center street, New York City.

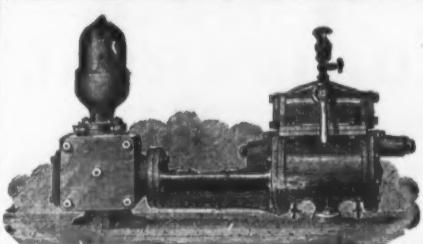
LYON'S HAND OR POWER PUNCHES AND SHEARS.



CINCINNATI CHAIN HOIST CO.,
81 and 83 East Third St., Cincinnati, Ohio,
Sole Agents in adjacent states for

BOXE'S SCREW HOISTS,
Watchman's TIME DETECTORS at \$40.00 to \$75.00.
Send for Catalogue.

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PATENT**



"SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad

For reduced price lists address **A. S. CAMERON**, East 23d Street, New York.

**Bliss & Williams,
PRESSES**
MANUFACTURERS OF ALL KINDS OF



Also Manufacturers of
SPECIAL MACHINERY
FOR
WORKING SHEET
METALS, &c.
FRUIT & other
CAN TOOLS.

GOLD MEDAL AWARDED



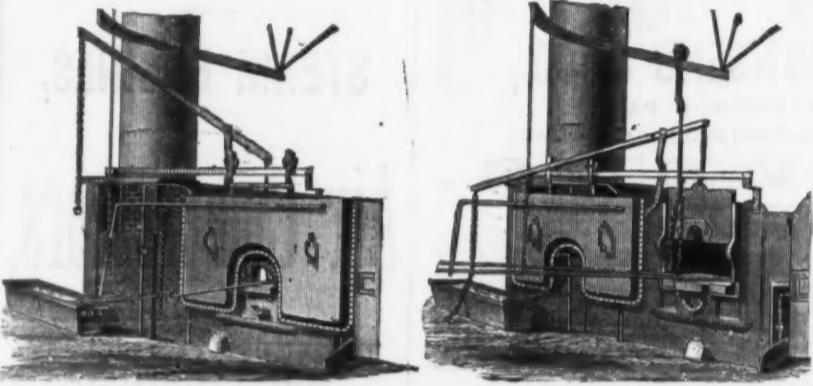
Plymouth, Pearl and
John Streets,
BROOKLYN, N. Y.,

U. S. A.



PARIS EXPOSITION. 1878.

**McDONALD'S
PATENT SHIELD.**



For Protecting the Men from Heat when Working in Front of
Puddling, Heating and other Furnaces.

H. McDONALD, Patentee,
MANAGER SLIGO ROLLING MILLS,
PITTSBURGH, PA.

NEW OTTO SILENT GAS ENGINE.



2, 4 and 7 H. P. and upwards. Built by
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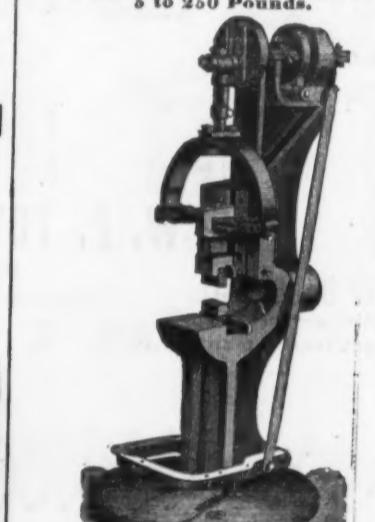
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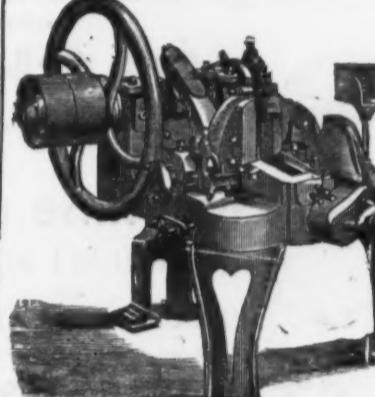
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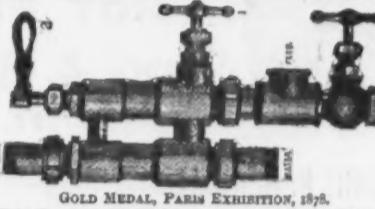
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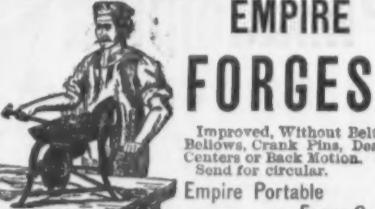
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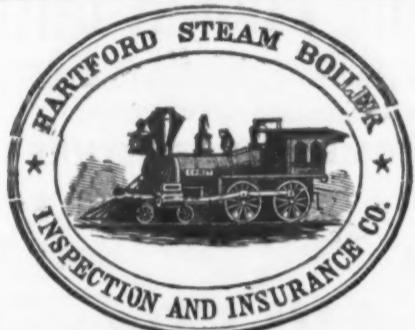
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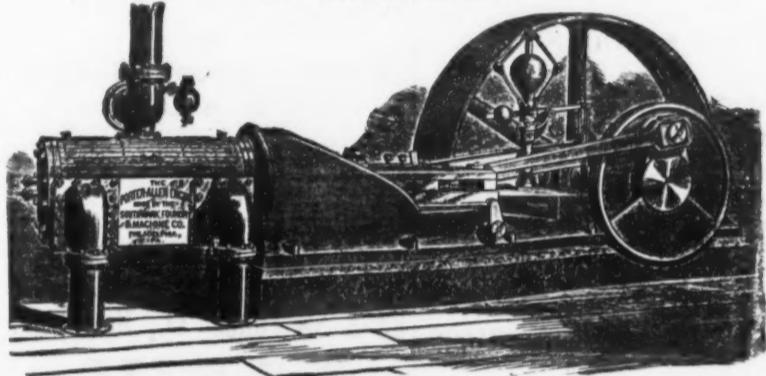
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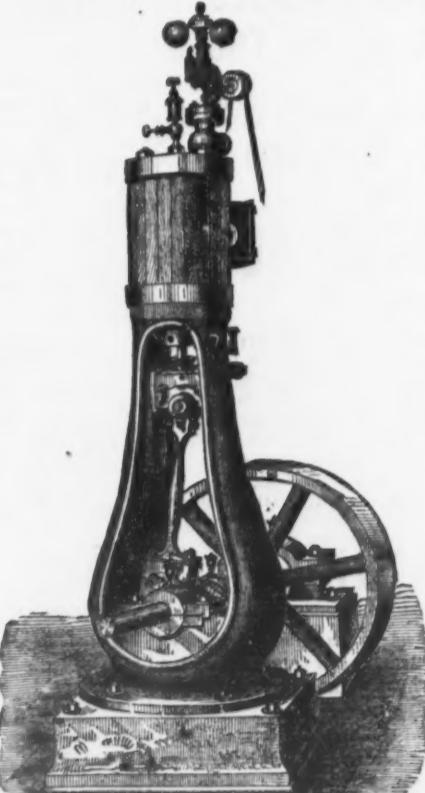
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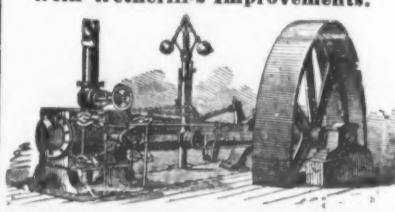
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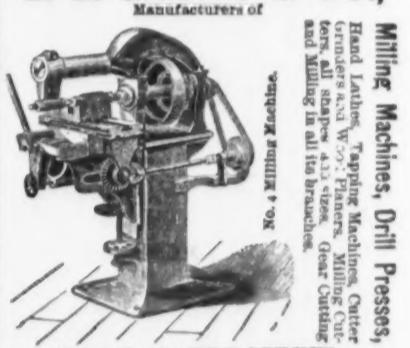
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